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SEPTEMBER 1984

VOLUME 2
NUMBER 9

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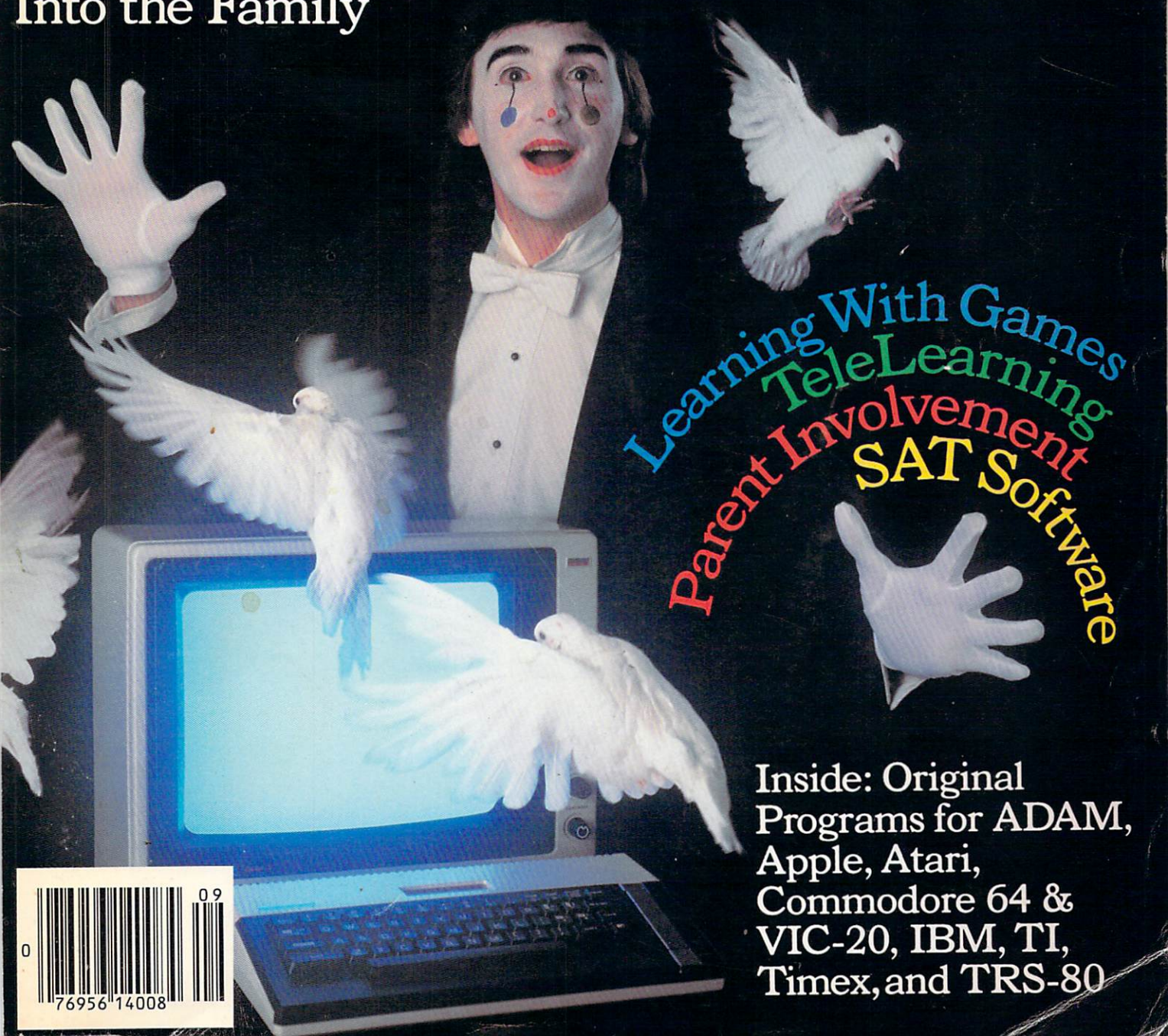
FAMILY COMPUTING

ANNIVERSARY ISSUE

Computers & Learning: A Magical Mix

Kids Who've Made It Big

How to Work the Computer Into the Family



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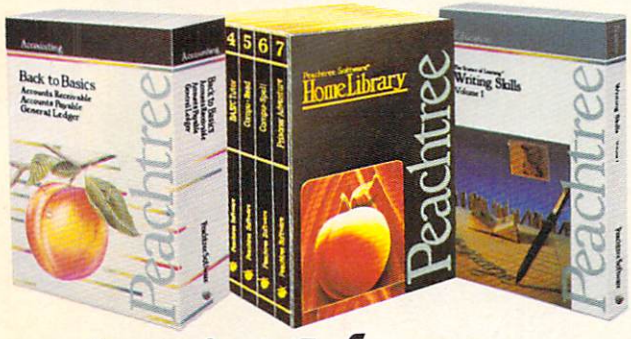

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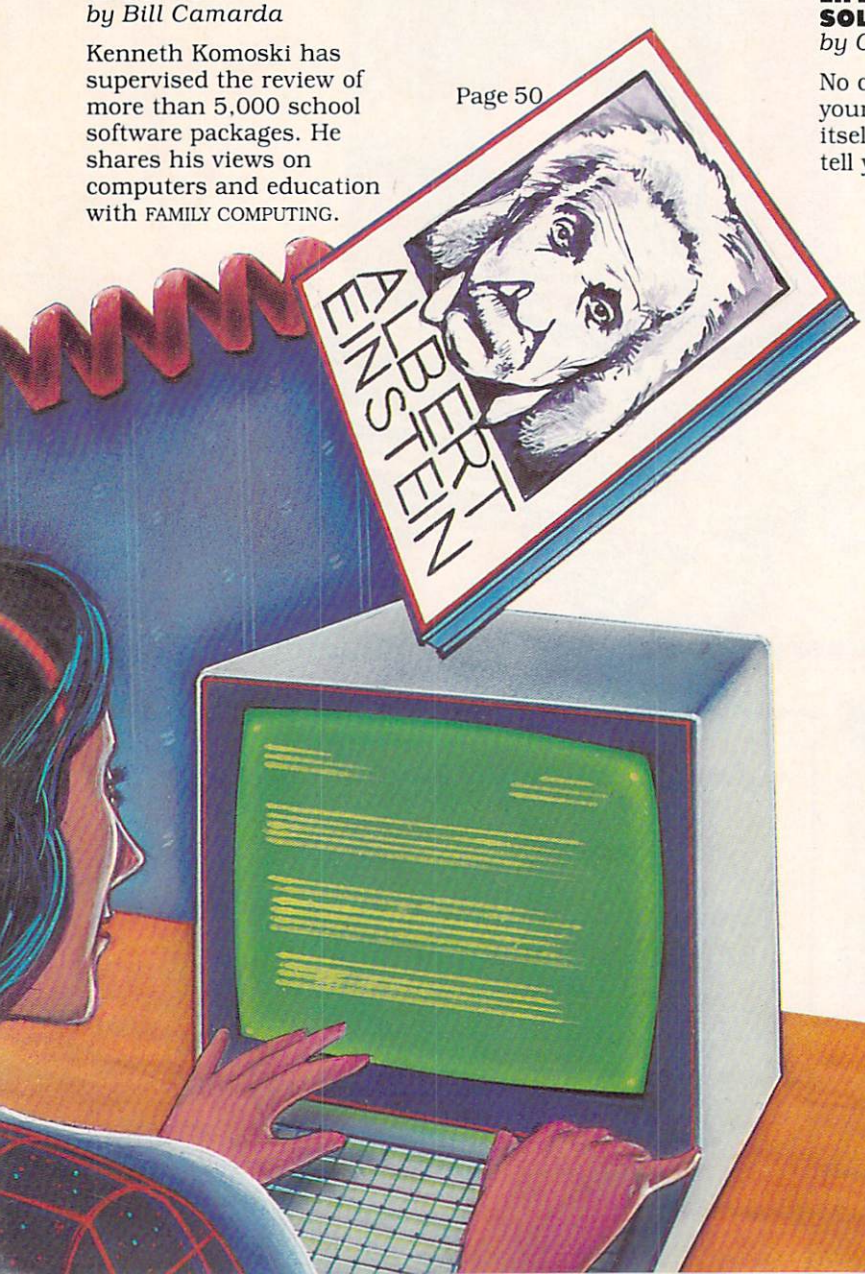

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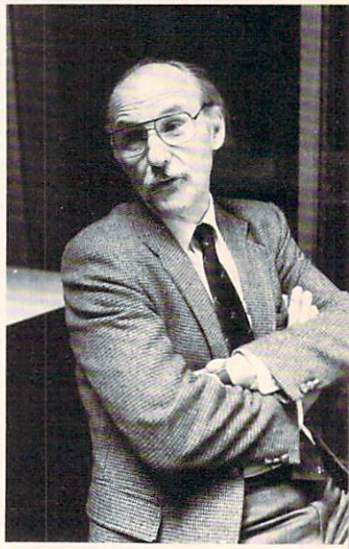

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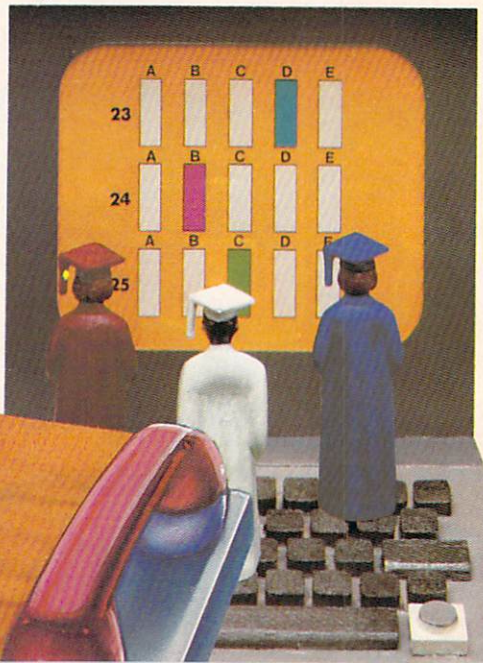

SEPTEMBER
1984

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VOLUME 2
NUMBER 9

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For enthusiasts of all levels.

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Introducing a regular feature that will have you programming in no time.

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FAMILY COMPUTING (ISSN 0738-6079) is published monthly by Scholastic Inc., 730 Broadway, New York, NY 10003. Subscriptions: in the U.S. and possessions, 12 issues for $19.97; outside the U.S. add $6 (surface mail) or $25.97 (airmail). Office of publication: 351 Garver Rd., P.O. Box 2700, Monroe, OH 45050-2700. Application to Mail at Second Class Postage Rates is pending at Monroe, Ohio, 45050-9998 and additional offices. POSTMASTER: Send address changes and notice of undelivered copies to FAMILY COMPUTING, P.O. Box 2511, Boulder, CO 80322. Printed in U.S.A. Copyright © 1984 by Scholastic Inc. All rights reserved.

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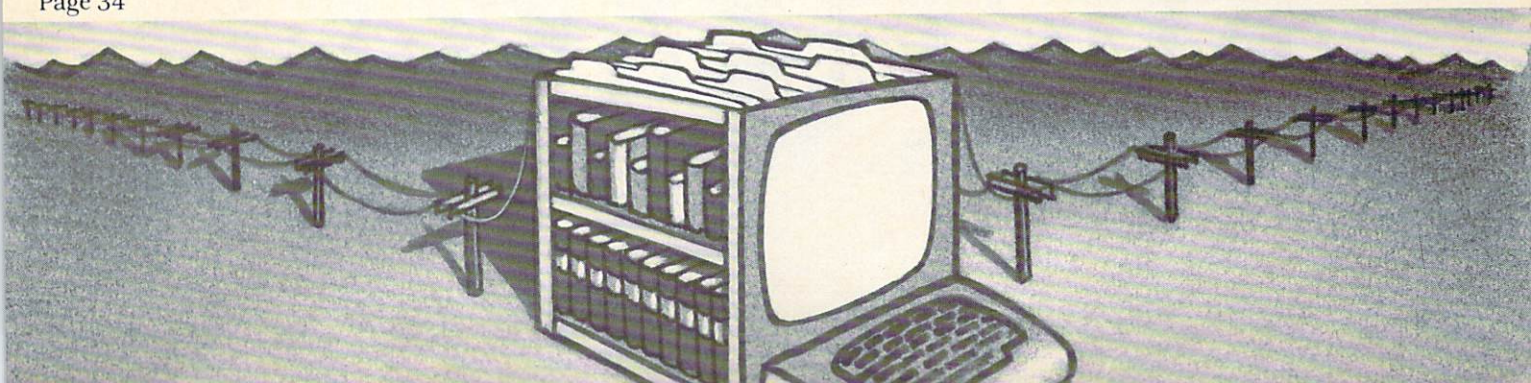

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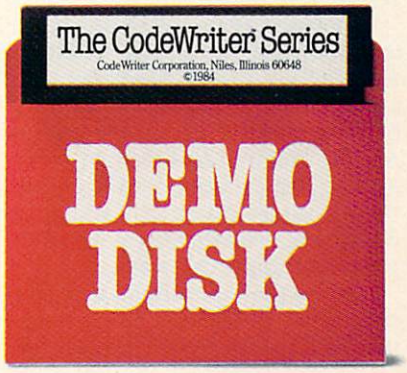

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EDITOR'S NOTE

JUST A SUCKER FOR SEPTEMBER

For as long as I remember, September has been my favorite month of the year. It's meant a time for so many new things—the school year, friends, at least one new fall "outfit," and, above all, ideas—*learning*. I could hardly wait until I was old enough to start school. So, when I was still 4½ years old and officially too young to enroll in kindergarten, I made life miserable for my mother, until she found a way around the system.

I'm such an obvious sucker for back-to-school nostalgia that I won't pretend I've never written about the subject before. But this year is different. It not only marks our first anniversary issue, but also the celebration of a new kind of exciting learning—with computers—that is revitalizing learning everywhere. It was the awareness that families were taking on a new role in their children's education, and that adults too were eager to master this technology at home, that led to the decision to publish FAMILY COMPUTING.

The impact of the new, widespread access to information made possible by the microcomputer is the main topic on the mind of Kenneth Komoski, the prominent educator who's the subject of this month's interview, conducted by our own Bill Camarda. Komoski's insights place computers in their proper, long-term perspective.

Our Home-School Connection (page 16), by Anthony D. Fredericks, is full of useful advice for parents and teachers who want to promote better computer use in their school. And in this month's Games column author James Delson talks about all the learning—much of it unexpected—that's available through some popular computer games.

Among the computer's greatest benefits is the access to learning it brings to people who formerly were isolated by their physical inability to travel to a school. This month's lead feature, "TeleLearning: The Computer Brings the Classroom Home" explains how anyone with a computer and a modem can learn from home, with the possibility of even going so far as to earn a college degree.

For the precollege set, the prospect of taking the SATs has traditionally set their hair on end. Now, the tutoring programs that have become so popular in recent years have "gone computer." "SAT Software: Does It Make the Grade?" explores the value of these programs and compares their features.

Because we seek to serve people undertaking a learning process, education-related articles are part of every issue we publish. We try to focus on new ways to learn old subjects and on new subjects that were born with the computer, such as programming languages. If you've been meaning or wanting to try your hand at learning to program in BASIC, don't miss our brand-new "Byte-Size BASIC," page 76.

If Logo appeals to you, you'll want to follow our six-part series on "Learning Logo," beginning in this issue (page 44). The important message we want to get across is: Don't ever hesitate to try a new learning adventure. I'm enjoying one right now, writing this copy in Detroit, Michigan, on a 4-pound Radio Shack Model 100 and transmitting it by phone to FAMILY COMPUTING's New York office. The computer has made it possible for me to fulfill family obligations in one city and meet the demands of my job in another. These are important parts of my life, but it's only because of a computer that I can do justice to them both.

Claudia Cohl

CLAUDIA COHL
EDITOR-IN-CHIEF

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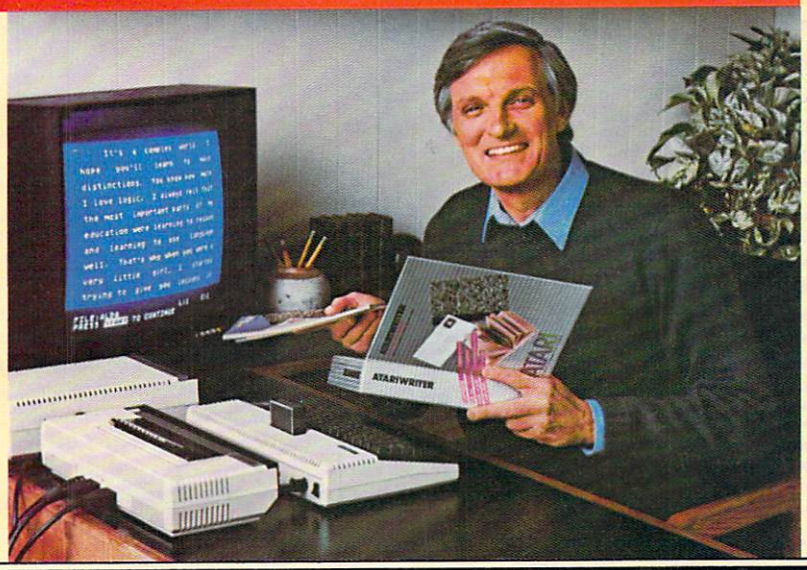

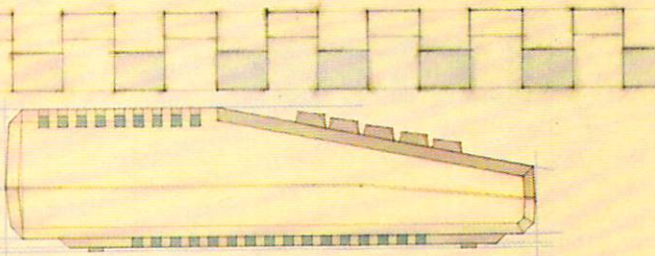

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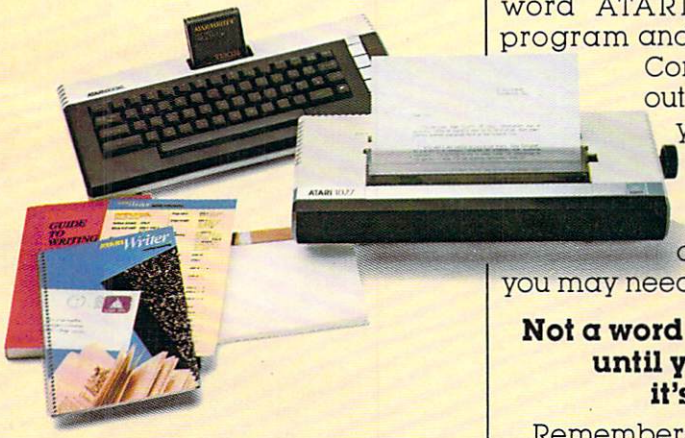
—Alan Alda



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DISCOVER WHAT YOU AND ATARI CAN DO.

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LETTERS

A MIRACLE GADGET

I just discovered that I'm an inventor. I call my miracle gadget the "Data Liner." It has eased the drudgery of typing data statements, and hopefully other FAMILY COMPUTING readers can benefit from it.

Our TI and its expansion box take up most of the room on my sewing-machine cabinet leaving little room for a magazine. Whenever I copied a program from a magazine, the magazine invariably found the worst time to slither to the floor. I now fold the magazine, leaving only the column I'm copying showing. A rubber band keeps it from unfolding and the magazine no longer slithers. An added bonus is that the rubber band can be scooted down the page—underlining difficult lines such as data statements—hence Data Liner.

LOUISE GOAD RITCHIE
Frankfort, Kentucky

TUTORING SIS

My TI-99/4A has been great for my family ever since we got it. My father has one also, but all he does is play games on it! Last weekend I went over to his house, and I just happened to bring along my collection of FAMILY COMPUTINGS. My sister told me she had never seen a PRINT statement nor ever touched a computer keyboard. Then I showed her how to type in a program and explained what some statements meant; we accomplished a lot. Her two favorite programs were the *Turkey* (November 1983 issue) and *Personal Valentine* (February issue). I want to thank you for showing my sis the world of computer programs.

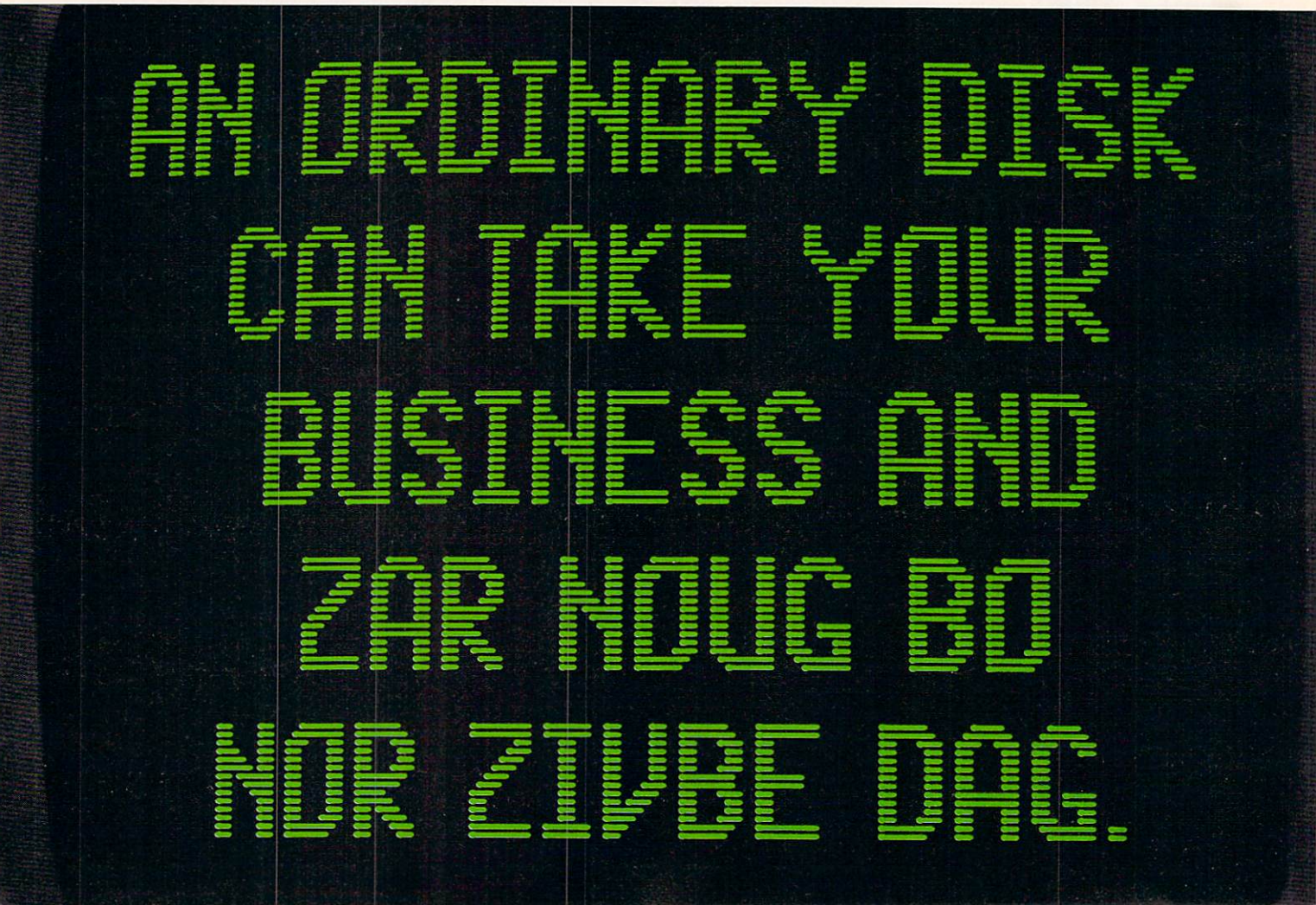
JENNIFER SVOBODA, *age 13*
Villa Park, Illinois

SOME WORDS FROM HOMEWORD

I would like to take this opportunity to thank you very much for your review of *HomeWord* in the June issue. Given the range of features that were noted, I realize it is very difficult always to be 100 percent accurate. The only point I would like to correct is the N/A listing under chain printing for *HomeWord*. While a few of the word processors listed had chain printing, the INCLUDE document facility in *HomeWord* is much more powerful than simple chain printing because it returns to the original file upon completion of printing the included document.

It therefore allows the user to include standard paragraphs in the middle of documents. The INCLUDEd documents may be of any length and may contain additional INCLUDES. You are allowed up to eight levels of INCLUDE, which should be sufficient for anybody's needs.

THOMAS CAIN, *president*
Target Technologies, Inc.
Norwalk, Connecticut



COMPUTING: IT'S THE CAT'S PAJAMAS

As a subscriber to FAMILY COMPUTING, I am sending an enlargement of a photo I took of our cat using our Commodore 64. I feel this picture is an example of a complete computer family!

CINDY L. FEIOCK
Canton, Pennsylvania

EAGER FOR NEW INFO

After buying the January issue of FAMILY COMPUTING, I found it to be worth every penny. The article The Primer was very informative for me since before reading it I knew nothing about computers. I was very anxious to purchase the February issue to receive additional information in The Primer. (The January issue stated: "New information will be presented periodically, and existing sections will continually be adapted and updated.") I have just bought the February issue and found the information exactly the same as the previous month's.

I hope that the information will change in future issues, as I have subscribed to your magazine and am still eager for my next issue.

KIM O. PRICE
Waterville, Maine

EDITOR'S NOTE: *Eager to add new columns, such as Telecomputing and a special series on Logo (starting in this issue), we may have neglected The Primer. But, we haven't forgotten our promise. An expanded version will appear in the November issue. Thanks for the reminder.*

THANKS FOR GREAT STUFF

Thanks for putting in programs for the (TRS-80) Color Computer. I thought the Mother's Day program in the May issue was great. Please continue the good work, although I wish you would include more puzzle programs for the TRS-80.

And would you please tell me what computer is used to draw the "Basic Booth" cartoons? I think they are great.

TERRY DUPLANTIS
Kenner, California

EDITOR'S NOTE: *The computer-generated cartoons George Booth has created for "Basic Booth" have been done with a Commodore 64 and a KoalaPad. And, when we run a puzzle program, we include a version for the Color Computer.*

CORRECTION

In the August FAMILY COMPUTING Games column, we published incorrect information about tips for Infocom text adventures. *Invisiclues* and a map for every Infocom adventure are available for $7.95 each, by calling (800) 262-6868 or writing to: Infocom, C.S. 6237, Farmingdale, NY 11735.

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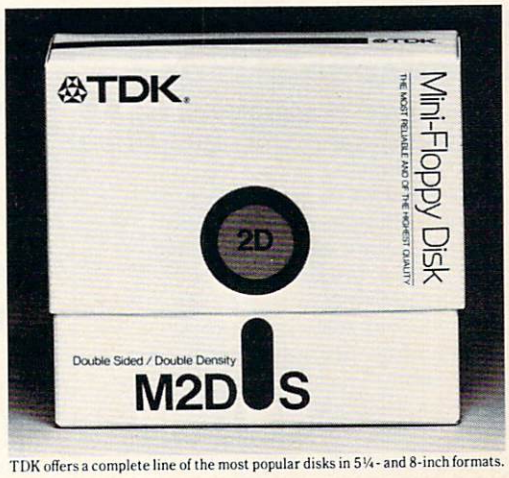

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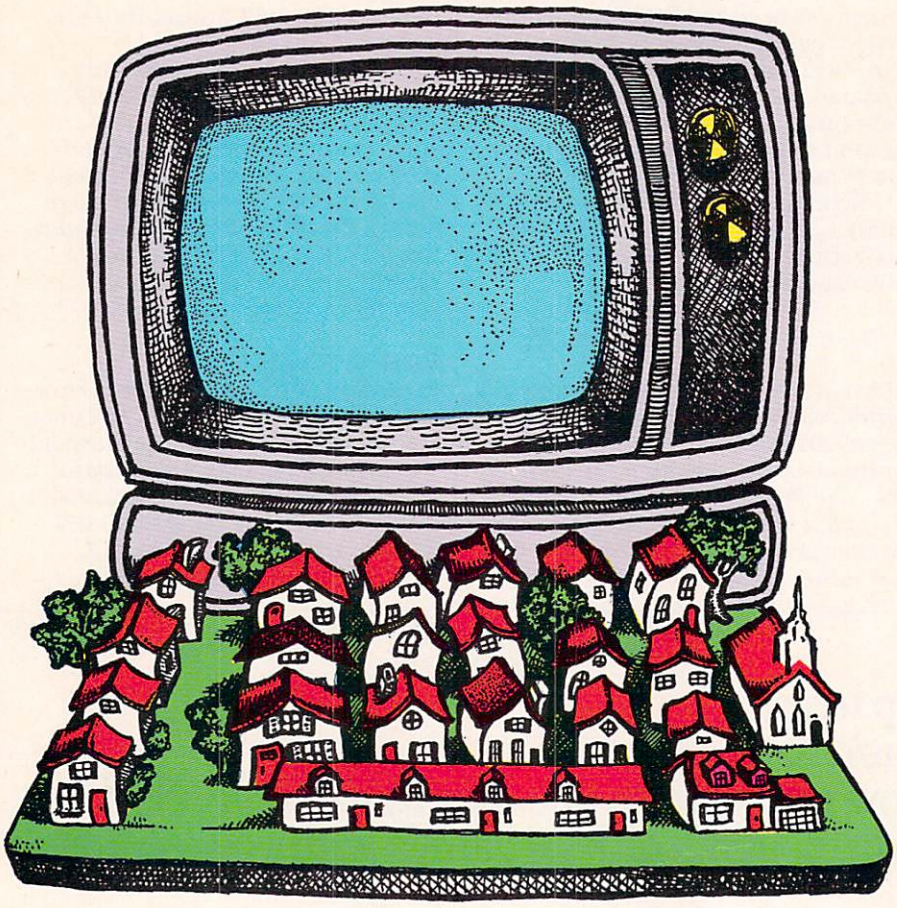


Making Computers a Household Word

In Menlo Park, California, you can buy a house that practically runs itself—by computer.

Model homes in Southampton Co.'s new Benicia development feature a "home control package," which uses a microcomputer and software to monitor the heating, electrical, and security systems. They also have a computerized water system with sensors that detect dry soil and activate lawn sprinklers. Southampton will install all the wiring and sensors for you; you just have to buy the central computer.

Silicon Valley families that don't want the "home control package" can still get "computer ready" homes with large closets that have been prewired for easy conversion into computer workstations.

Southampton Vice President Victor Freeman says computer ready homes are designed for the growing number of people who are working at home, via the computer.

—PAM HOROWITZ

Two-Faced Floppies

That game you bought for your Commodore 64 won't run on your friend's Atari 800XL, right? Right . . . until now. Some software manufacturers are beginning to sell disks that will work on more than one kind of computer. If the trend continues, it could mean more convenience and lower software prices for home computer users.

Scarborough Systems of Tarrytown, New York, is introducing two new software packages in which a Commodore 64 program appears on one side of a floppy disk, and an Atari version appears on the flip side. The programs are *Run for the Money*, an educational game, and an as yet unnamed personal finance management program.

"I think we'll also be doing that in the future," said Peter Johnson, advertising manager for Synapse Software in Richmond, California. "We really think it's both to our advantage and to the retailer's advantage." Software retailers like any innovation that puts more than one version of a program into the same package, because it lowers their inventory costs. In a competitive marketplace, this could mean lower software prices.

"Intersystem formatting," a new technology developed by Data Encore of Sunnyvale, California, may allow some software companies to put two versions of a program on the *same* side of a disk.

Nortronics Inc., a Minneapolis, Minnesota, firm, uses the process in its *Diskette Head Cleaning Kit*, which runs on both the IBM PC and the Apple II series.

One limitation of intersystem formatting is that programs must be small enough to fit on a disk with other versions. This means the technique will most likely be used with utility or game programs, not with complex business software.

Silicon Valley East

For years, the old Wannalancit textile mill in Lowell, Massachusetts, sat deserted. Now, it's filled with companies such as Hayden Software, Cadmus Computer Systems, and Custom Silicon. They are the symbol of Lowell's change from a depressed mill town to a town at the forefront of the computer revolution.

"There's a new spirit here," said Raphael Miller, who's in charge of a massive project to put computers in the Lowell schools. "Lowell needed to pull itself out of a mill town psychology, and it has." →

ILLUSTRATION BY HOLLY KOWITT

Your Personal Net Worth™

Its only business is managing your home finances. No program does it more quickly, more easily, more directly.

Your Personal Net Worth systematizes the management of your household income, expenses, credit cards and check books — using methods tested for accuracy by Touche Ross, one of the nation's leading accounting firms.

Your Personal Net Worth puts your computer to work, keeps your records straight, including your personal inventory of valuables and stock portfolio, tells you where and how you're spending your money or if you're making a shambles of your budget. And does it all in less time than it takes you to balance your check book.

Nothing else — no other program at twice the price — makes handling your personal money matters simpler, faster and more direct than **Your Personal Net Worth.**

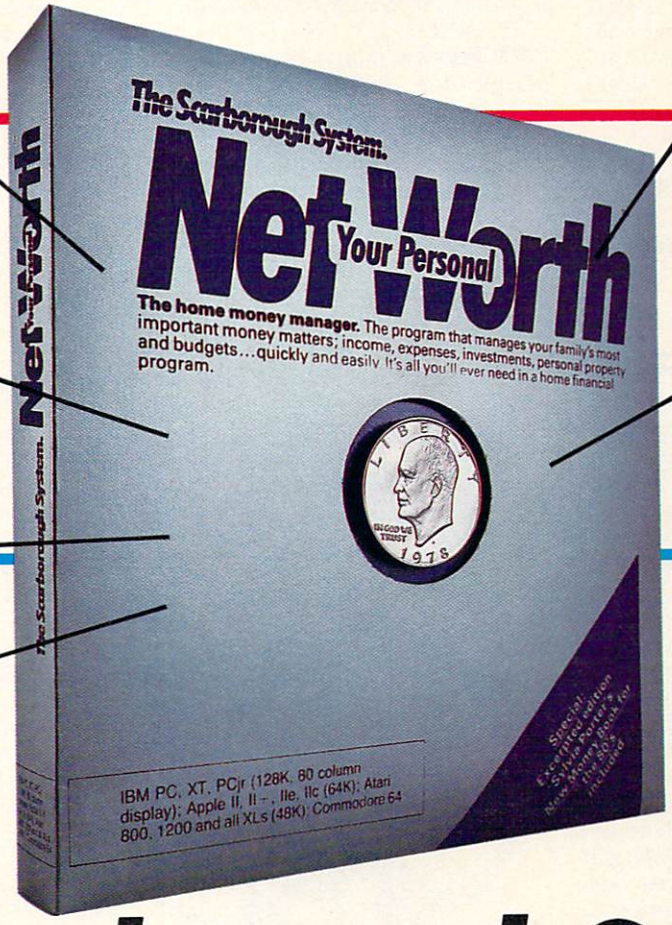
You'll find it at your favorite software retailer in the silver box with the real silver dollar on the front. It could be the single most valuable purchase you'll ever make.

Record all banking and any credit card transactions, reconcile bank statements instantly (up to 10 separate bank accounts can be handled), — print checks, too.

Set up a budget (as many as 350 categories) — and then compare your actual income and expenses to the budget.

Never forget a tax-deductible item. Today or at tax return time.

Display or print every financial report you'll ever need.



Record stock, bond and other investment transactions. Inventory household valuables, collectibles and important papers for insurance and other purposes.

Your Personal Net Worth works fast because it's in machine language. Documentation in plain English is referenced for easy use. "Help" functions on screen at all times.

Available for:

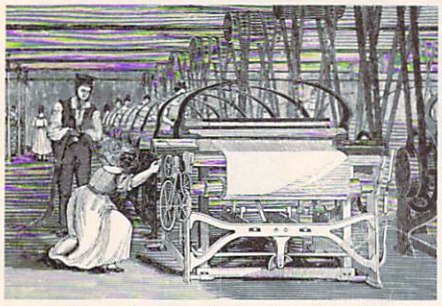
IBM-PC/XT/PCjr (128K)
Apple II+/IIe/IIc (64K)
Commodore 64
Atari (48K)
The Program comes with two disks, one of which has accounts already set up for entry. However, only one disk drive is necessary.

The Scarborough System.

You'll grow with us.

© 1984, Scarborough Systems, Inc., 25 N. Broadway, Tarrytown, N Y 10591

BEHIND THE SCREENS



Some of Lowell, Massachusetts' old textile mills now house state-of-the-art computer companies.

The changes in the city began a decade ago when local leaders, working with Lowell-born U.S. Senator Paul Tsongas, organized a massive effort to bring in high technology. In 1977, Wang Labs, a nearby word-processing and microcomputer company, moved its headquarters to Lowell. With 13 local plants, Wang is now the city's largest employer.

City officials say it was the cooperation between business and government that made the drive for high technology work here, as compared to other communities where it has failed. And work it has: The unemployment rate is now a low 3.9 percent, down from 15.8 percent in 1974. More than 12,000 new jobs have been created in Lowell, a city of 92,000 people, and almost all are in the computer industry.

—KATHRYN BONN

The Oxford English Data Base

The *Oxford English Dictionary*, all 20,000 pages of it, is being computerized. At the end of this $10 million, 4-year project, home computer users should be able to retrieve *OED* entries on-line, and they may be able to buy a complete *OED* videodisk.

One hundred and twenty typists at International Computaprint Corp. in Fort Washington, Pennsylvania, have been at work typing the 60 million words that comprise the *OED*, which is commonly considered the ultimate reference work on the English language. They should be finished next month. Then comes the task of figuring out who'll be using the "New" *Oxford English Dictionary*—and structuring the data base to meet their needs. For example, there may be special versions of the *OED* for medicine, law, sports, and music.

The *Oxford English Dictionary* is celebrating its 100th anniversary this year. Oxford University Press spokesperson Jeffrey Seroy says, "English, in the computer age, has become the world language. Computerization will ensure that the *Oxford English Dictionary* remains the principal dictionary of that language. The new *OED* [is] a project not of national or regional, but of global proportions."

IBM's British division contributed $1.4 million to help Oxford University computerize its dictionary.

ILLUSTRATION: MERRIMACK VALLEY TEXTILE MUSEUM

Nibbles

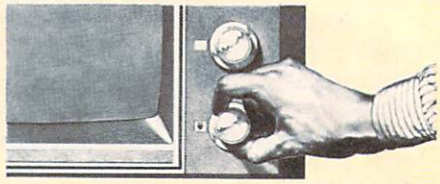
Lifeboat for Abandoned Computers: Lifeboat Associates, which publishes software for over 300 microcomputers, says it will keep producing and selling software for computers discontinued by their manufacturers. In particular, Lifeboat will support the TI-99/4A, Osborne I, and Victor 9000 computers. For a catalog, write to Lifeboat, Dept. C, 1651 Third Ave., New York, NY 10128.

PC Perks: Major companies are beginning to give free personal computers to top managers, according to Executive Compensation Services, Inc. (ECS), a consulting firm. While only 3.9 percent of the firms surveyed gave away computers last year, that number will grow quickly, according to ECS President Edward T. Redling. "It's a perk that companies gladly provide because it makes the executive more productive."

A Million Bits: That's how many fit on IBM's newest experimental memory chip—four times their previous record. IBM used existing facilities to make the chip, which means it could start mass-producing them sooner than had been expected. These "megabit" chips could show up on office computers in just a few years, and then, who knows . . .?

IBM's Karen Kaigle holds a batch of brand-new megabit chips.

FAMILY COMPUTING Comes to TV



We'll see you on TV next month—and every week for the next six months.

A new TV series based on FAMILY COMPUTING magazine is about to premiere on the Lifetime Cable Network, which reaches nearly 24 million cable subscribers nationwide.

Like FAMILY COMPUTING magazine, our television series will focus on people, not machines. We'll show how real families are using computers in everyday life. We'll offer consumer tips on buying software, and show you what's new in computer graphics. The 26-program series will have something for everyone—parents, children, novices, and experts.

We'd like you to be part of our TV show. Do you have questions you'd like answered? Ideas you'd like to share? An exciting new use for your computer? Drop us a line. The address is "FAMILY COMPUTING TV Show," 730 Broadway, New York, NY 10003.

The show will be coproduced by Scholastic Productions Inc., a subsidiary of Scholastic, Inc., publishers of FAMILY COMPUTING; and by Al Perlmutter, whose credits include "Consumer Reports Presents," and "The Great American Dream Machine," an Emmy-winning PBS newsmagazine show broadcast during the early 1970s.

Look in your cable guide for the FAMILY COMPUTING broadcast schedule in your area.

If you've got a good bite-sized piece of computer-related news involving people, trends, or innovations, let's hear it. We will pay $25 for each item we publish. Write to Behind the Screens, c/o FAMILY COMPUTING, *730 Broadway, New York, NY 10003.*

ILLUSTRATION BY NICK JAINSCHIGG

These are the hands of a master typist. (Jonathan Pandolfi, age 7.)

MasterType™—the best-selling program that turns learning into child's play.

Given the choice of learning a skill or playing a game, most kids go for the game.

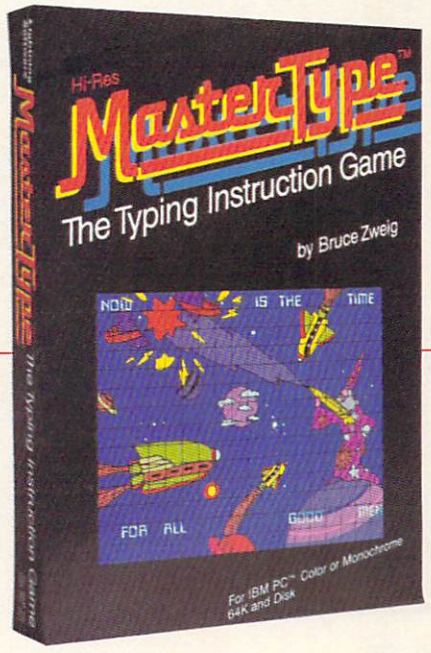
So how has MasterType™ gotten so many young kids to sit still long enough to learn to type?

By being fun. By bringing the fast action of video games to each of MasterType's lesson program segments.

Kids get so caught up in zapping spaceships, they hardly realize they've mastered the keyboard.

Warning: Parents like it, too. And may find themselves unwittingly becoming expert typists before they know it.

Disks: Apple®, Atari®, Commodore 64® $39.95
IBM-PC $49.95
Cartridges: Atari®, Commodore 64® $39.95



Try the other programs in the Scarborough System—Songwriter™, PictureWriter™, Phi Beta Filer™, PatternMaker™ and Run for the Money™. All Scarborough software utilizes your computer's capabilities to the fullest. And perhaps more importantly, all are easy to use.

Apple, IBM and Atari are registered trademarks of Apple Computer, Inc., International Business Machines Corp. and Atari, Inc. respectively. Commodore 64 is a trademark of Commodore Electronics Limited.

The Scarborough System.

You'll grow with us.

© Scarborough Systems, Inc., 25 N. Broadway, Tarrytown, New York 10591

How to talk your parents

There's a new Apple® Personal Computer called the IIc that's so complete and so affordable that getting your parents to buy one should be easier than learning Logo.

If, that is, you know what to say.

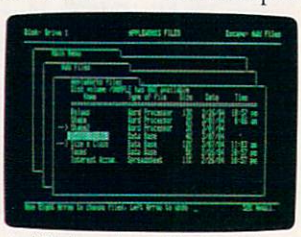
For example, don't tell your parents that the IIc has the first true 128K VLSI motherboard, dual built-in RS-232 ports and a built-in half high disk drive. Or that it has a switchable 80/40 character display and built-in mousetronics so it can use an AppleMouse.

You know that's incredible in an 8 pound* computer, but all those specs may make your parents uncomfortable.

Just tell them that the Apple IIc can run more than 10,000 programs written for the Apple IIe, the most popular computer in education at all levels. And it works just the same as the Apple computers you learn on in school.

You might also mention that it's a bargain. It comes with everything you need to start computing in one box—including an RF modulator that lets you hook it up to your TV the moment you get it home. There's even a free 4-diskette course on computer basics they

The IIc shows off its true colors with SubLogic's Flight Simulator II.



AppleWorks—advanced business software even a parent could love.

With MousePaint, you could become the next Picasso. Or the next Charles Schulz.

nto parting with $1300.

can use when you're too busy to show them how.

All for under $1,300.**

Of course, they probably won't want to hear that it runs more games than any other computer in the world except the Apple IIe.

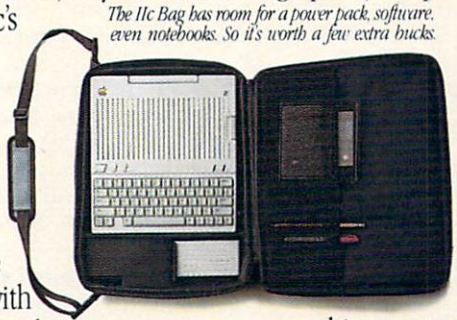
But they might like to know that it also runs advanced business software. Including specialized programs for every profession from doctoring to farming to astronauting. Not to mention personal productivity software to manage their personal finances and taxes.

Speaking of which, they can deduct part of an Apple IIc's price from their taxes if they use it for business.

Even if they always keep it at home.

Don't confuse them right now with the wide array of Apple IIc accessories and peripherals. Like Apple's 1200/300 modems. Or the IIc's low cost full-color graphics/text printer, Scribe.

The IIc Bag has room for a power pack, software, even notebooks. So it's worth a few extra bucks.



But assure them that your IIc can grow just as fast as you do.

Now, if all of these carefully reasoned arguments fall on deaf parental ears, don't despair. There is still one thing more you can do.

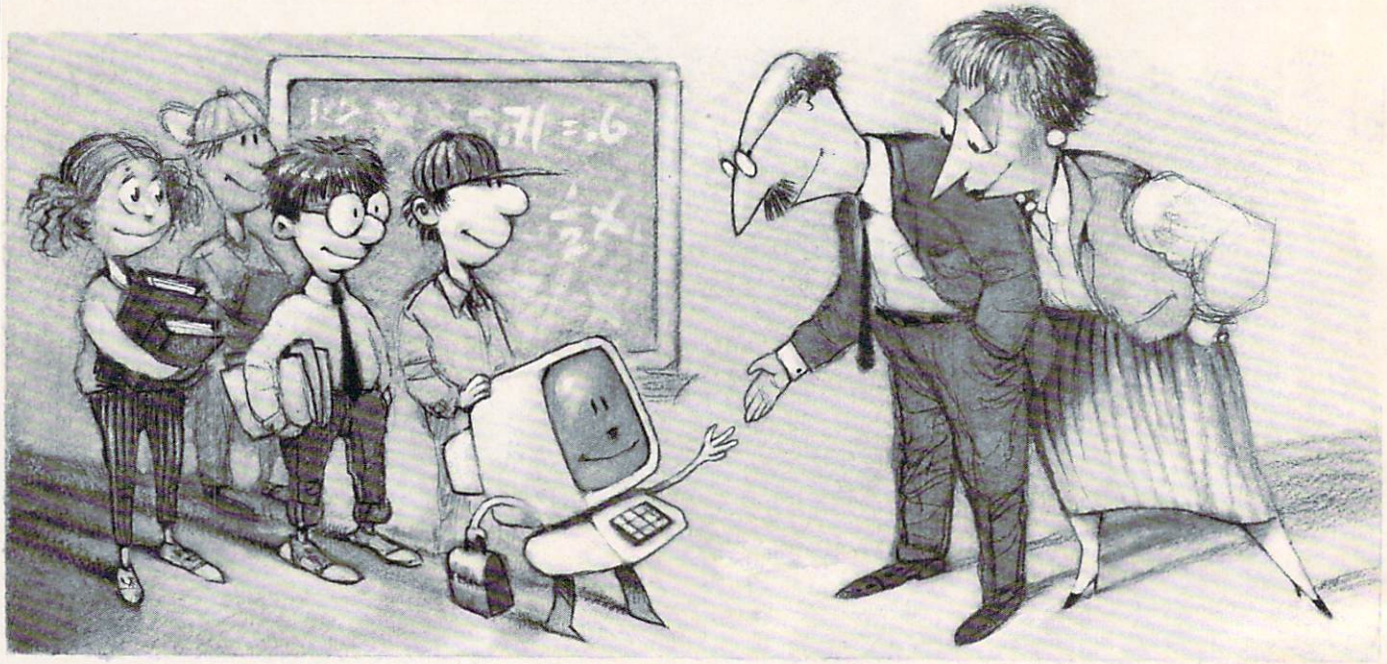
Get a paper route.

* *The IIc alone weighs just 7.5 pounds. Power packs, monitors, printers, modems and mice can make it as heavy as you'd like.* ** *Suggested retail price.* © *1984 Apple Computer, Inc. Apple and the Apple logo are trademarks of Apple Computer, Inc.* *For an authorized Apple dealer nearest you, call* **(800) 538-9696.** *In Canada, call* **(800) 268-7796** *or* **(800) 268-7637.**

HOME-SCHOOL CONNECTION

PUTTING OUT THE WELCOME MAT
12 Ways to Get to Know Your School's Computers

BY ANTHONY D. FREDERICKS



The revolution is upon us. Starting quietly, it built up some momentum, and is now surging forward at a rate difficult to keep pace with. And it's spreading faster and faster. What is it? The computerization of our schools. Not since the launching of Sputnik has such a movement swept up the educational consciousness of the American public.

Obviously, the impact that computers will have on our children's lives—both in the classroom and at home—will be felt for many years to come. This means we must begin developing bonds between home and school; partnerships that ensure our children can take advantage of all the benefits of this remarkable revolution. In fact, research shows that when educators and parents work together toward common goals, children achieve a much higher degree of academic success.

The impact of the computer revolution depends largely on the understanding that we have about its role in education. Keeping everyone informed about the dynamics of computers guarantees that the home-school partnership can be a positive one. There are lots of ways that community groups and parent-teacher organizations can take a leading role in promoting a better understanding of computers and their classroom applications. The following ideas offer you the opportunity to become more aware of and involved with the vitality of computers in education and their importance for your children—both now and in the future.

1. Workshops. Many of us need very basic information about computers and their educational uses, even if we already own one. To introduce the computers used at school, set up a series of workshops—informative discussions coupled with hands-on experience with both hardware and software. (*For more information, see the accompanying article.*)

2. Informational Guide. To reach a greater number of people, a committee of parents and teachers can produce a booklet or brochure. It could list the types of computers in the school, how they are being used as a part of the instructional process, the various opportunities that students have to use computers, and several questions and answers on common concerns. If you distribute these guides through local businesses or community organizations, you'll increase your audience.

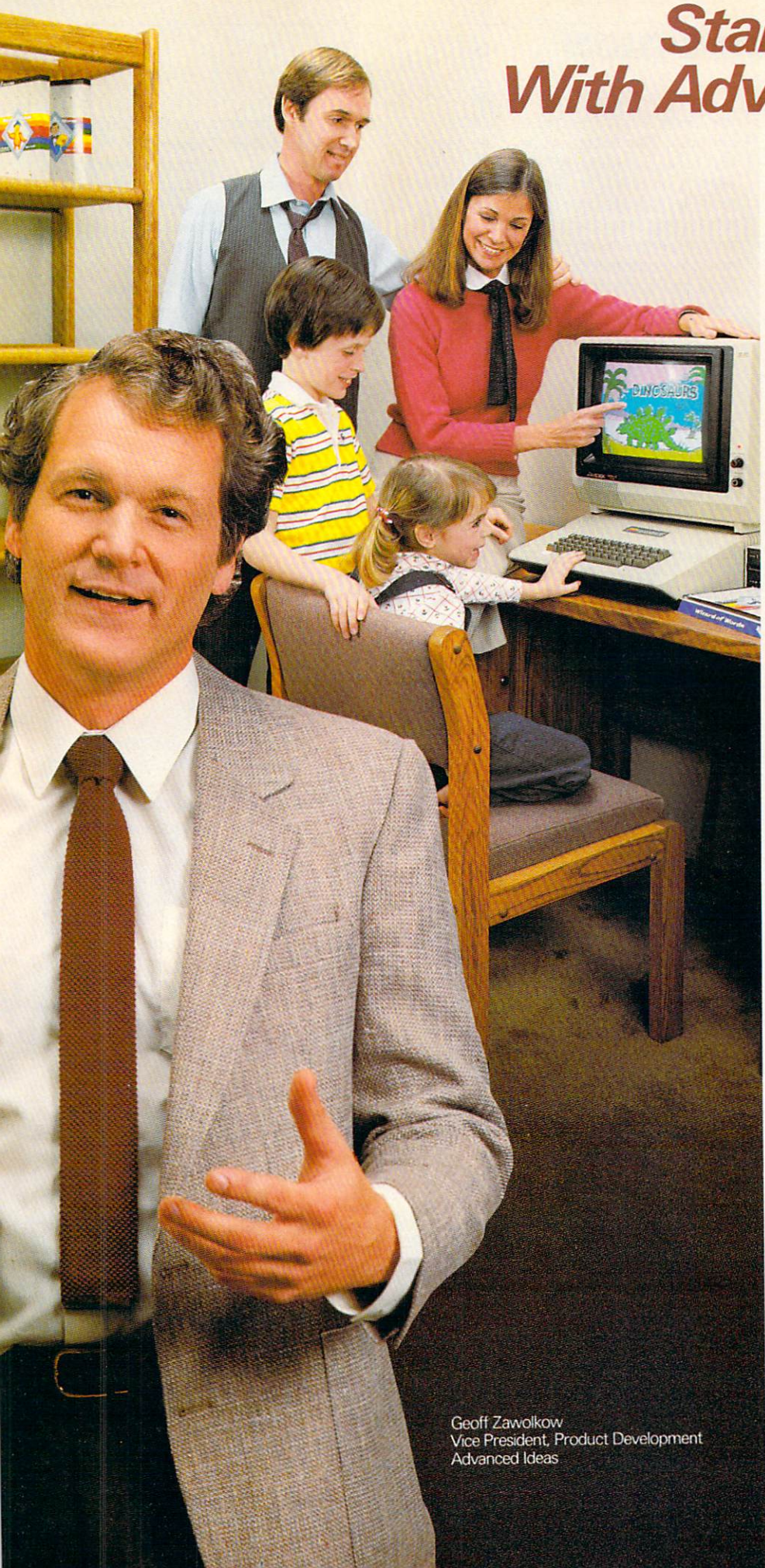
3. News Bulletin. A good way to keep everyone up to date on computer developments in the schools is by periodically publishing a newsletter. (You can even use a computer to produce it.) The bulletin could feature articles on 1) computer-related events at school and in the community, 2) software that has been acquired for certain grades or subject areas, 3) noteworthy items selected from a variety of computer-related magazines, 4) simple programs developed by teachers or students that families would enjoy using together, 5) a question-and-answer section, 6) recommended educational software that families can use at home, and 7) guest columnists (teachers, parents, administrators, *and* students) addressing specific computer issues.

4. Volunteer Program. Firsthand experience in working directly with hardware, software, and students can be an enlightening experience—giving parents real oppor-

ANTHONY D. FREDERICKS *is a reading specialist in the Catasauqua Area School District in Catasauqua, Pennsylvania, and a contributing editor to* Early Years *magazine. He has conducted community involvement workshops for parents and educators across the country.*

ILLUSTRATION BY HOWARD LEWIS

Start A Tradition With Advanced Ideas™



Geoff Zawolkow
Vice President, Product Development
Advanced Ideas

Bring the whole family together with programs that are educational, flexible, extendable and *fun*. As the years go by you'll be glad you did.

Families like yours know programs aren't all the same. And that a computer is only as good as the software that runs on it.

So go ahead. Demand programs flexible enough to fit your children's abilities as they grow. Insist on features that extend subject matter as far as you want to take it. And be unimpresed if the whole thing isn't great fun. Then watch as your family keeps coming back to Advanced Ideas. You'll discover that you've really started something.

How to Choose Software for Your Home

"As an educator with over a decade of experience using computers with children, I've found there are key features in a well-designed learning game. One is *extendability.*

Look for enough variety to hold your child's attention over time. Some games are appealing in the short run, but are quickly mastered. Supplementary materials such as disks of added lessons can continue your child's interest and enjoyment.

The ability to modify a program is another form of extendability. Authoring systems can let you create lessons on your own topic areas for any age level and allow children to create and save original work, giving a sense of completion and pride vital to learning."

Software of Choice

Advanced Ideas (formerly Computer-Advanced Ideas) leads the industry with programs designed for extendability through easy-to-use authoring systems and a unique library of LearningWare™ diskettes. Rich game play and sound educational design have won Advanced Ideas programs the approval of the National Education Association.

Ask to see a demonstration at your local computer store. Then make Advanced Ideas a tradition in your home.

Advanced Ideas™
Bringing Ideas Home

2550 Ninth Street Suite 104 Berkeley, CA 94710
(415) 526-9100

Advanced Ideas programs are compatible with the most popular computers: Apple,® IBM® and Commodore.™

Advanced Ideas programs are compatible with the most popular computers: Apple,® IBM® and Commodore.™

tunities to see the value and place of computers in the classroom. And, by volunteering in the classroom for several hours a week, you'll no doubt feel a greater involvement in your child's education. Warning: Setting up a successful volunteer program requires a great deal of time, as well as personnel willing to train the volunteers.

5. Computer Corner. When dealing with a new technology like computers, the importance of a comfortable learning environment cannot be overemphasized. Work with school officials to set up a special place (an unused classroom or storage room) where families and other community members can visit. Computer books and magazines, student-made and commercial programs, instructional materials for home use, and literature can all be made available for loan. Is is possible to lend some of the school's hardware on an overnight basis? It's a valuable opportunity for families to "preview" computers and software before buying.

6. "Hot Line." Not all parents have the free time to visit school during the day. You can, without much hassle, set up a telephone answering service for a few hours each evening (or on one night each week) to respond to the interests and concerns of parents. Or, tape a message and record it on an answering machine. Different messages each week would offer families a chance to call in and get valuable information in a casual manner.

7. Computer Conference. Show off! Extend invitations to the community, families, elected officials, and the press to visit the school on a scheduled evening. They could view the computing facility, observe the hardware and software in action, and discover how students use these new educational tools. If practical, engage the visitors in some programming, organize a debate, or schedule a series of sessions led by both teachers and parents on features of the computer program. In addition, invite company representatives to demonstrate their products and their uses in education. Be sure that news releases are sent to the local media both before and after the event.

8. Information Plus. Most everybody looks to the local newspaper for news of what's happening in their community. Check into the possibility of a column being published in your local paper to let people know what's going on in the schools. The articles could be written by a particularly knowledgeable parent or teacher—or it might be a terrific opportunity for a student who's interested in getting some writing experience. Public-service announcements distributed to the local radio stations are another way of keeping the community informed.

9. Computer Saturday. Turn machines into merriment by organizing a weekend computer fair similar to school carnivals. Displays, booths, and exhibits could be set up around the school emphasizing a variety of computer-related activities (for example, computer games,

HOW TO PLAN A SUCCESSFUL COMPUTER WORKSHOP

Many local parent-teacher groups are organizing computer workshops to introduce the role of computers in education. These workshops offer families hands-on opportunities to interact with computers in a relaxed, nonthreatening way. Whether they are organized as a single presentation or scheduled over several weeks, workshops need to follow several guidelines to be successful. The following information will direct you in planning worthwhile programs.

BEFORE THE WORKSHOP

1. Find out what people need. Use questionnaires, surveys, or checklists to determine what your audience already knows and what they need and want to find out. More workshops have failed because the potential audience's needs were not assessed, than for any other reason.

2. Involve as many people as possible. Get the support and participation of teachers, administrators, students, parents, and community members, including local vendors.

3. Choose a comfortable location. Whether it's the local school, a church, or community building, select a site that's convenient for everyone. Provide plenty of advance notice and check seating capacity, lighting, equipment, and arrangements for refreshments.

DURING THE WORKSHOP

1. Make it a family affair. Attendance will increase and support will be guaranteed if the entire family has opportunities to participate.

2. Design warm-up activities. Develop some creative icebreakers or activities that get participants started. Keep them fun and informal—but make sure they are related to the content of the workshop.

3. Keep the lectures to a minimum. Remember that people learn more with actual hands-on contact with computers. Games, simulations, and guided practice can stimulate greater awareness and appreciation than do traditional lectures.

4. Use a variety of activities. Offer participants a lot of group interaction and active participation. Vary group size, length of time segments, and ways of communicating.

5. Keep the workshop design simple and orderly. Present easier skills before more difficult ones. Demonstrations before actual practice is usually valuable. Above all, don't schedule too much in one workshop.

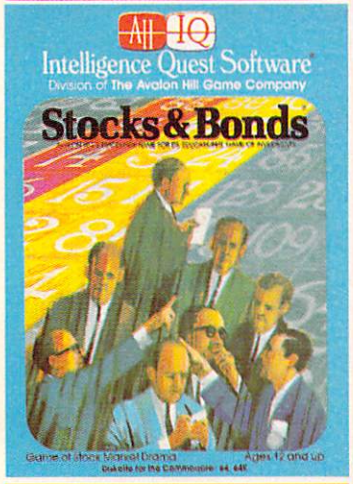
6. Be flexible. Be prepared to alter the design of the workshop or to make some changes due to unforeseen circumstances. Keep in mind family commitments, sporting events, or community activities that may affect attendance.

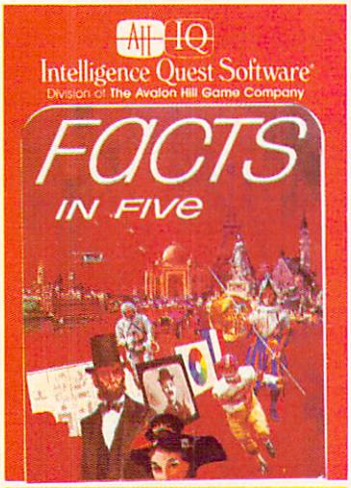
AFTER THE WORKSHOP

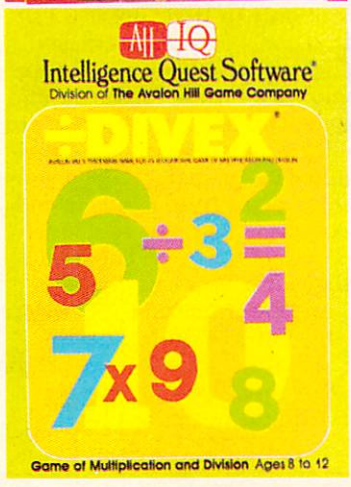
1. Conduct an evaluation. Ask participants to identify the most helpful parts of the workshops as well as the most disappointing. This information can be invaluable when planning future events.

2. Provide follow-up. Offer participants the opportunity to write or call for further information. You may even want to provide additional practice sessions for those who missed some scheduled events.

3. Enlist volunteer support. Recruit participants from previous workshops to serve as instructional aides for the next series. They'll have developed an additional appreciation for the role of computers, but even more important—they will be enthusiastic and will pass that along.







Get an IQ for YOUR home computer!

MARKET FORCES: The law of supply and demand reigns supreme in this game that shows exactly how fortunes are made and lost. The object is to know when to buy and sell the six commodities in competition with other players and your computer. An exciting, fast moving, educational game. Portrays what real-world economics is all about. Ages 12 to adult.
Commodore 64® and Atari® (32K) cassette; two-sided diskette for Commodore 64® and Atari® home computers. $16.00/$21.00

COMPUTER STOCKS & BONDS: A valuable tool for teaching important concepts that influence modern investment strategies. Fast-paced and enjoyable format allows players to invest in securities and challenges them to show a profit in their dealings. As play progresses, the player gains a graphic understanding of such concepts as Bull and Bear markets, the importance of performance histories in planning an investment strategy and many other factors that apply to the modern stock market.
Commodore 64® and Atari® (48K) cassette; diskette for TRS-80® (32K), Apple® (48K), Atari® (40K), IBM® (48K) and Commodore 64®. $20.00/$25.00

COMPUTER FACTS IN FIVE: A game of knowledge, where the player(s) select subjects and categories. Teachers, parents or students can choose subjects such as mathematics and spelling, with unique options for controlling game difficulty. An unlimited tool for testing any player's comprehension of man's total knowledge. Truly a game for all ages . . . especially trivia buffs!
Diskette for Apple® (48K), Atari® (48K) and IBM PC® (64K). $26.00

DIVEX: A challenge to the child's ability to handle basic multiplication and division. The child is required to use mathematical skills to protect an area from incorrect answers, in the form of rocket ships, that try to land from above. Each game contains 3 levels of multiplication and division. In division levels, the player attempts to destroy numbers not divisible and let those that are land safely. In multiplication levels, the player attacks numbers, not the product of the multiplier, while allowing correct answers to land safely. In all cases, when he or she destroys a correct answer by mistake, the computer will sound out and flash the correct answer on the screen. Allows a child (ages 8 to 12) to learn and enjoy at the same time.
Commodore 64® and Atari® (32K) cassette; two sided diskette for Commodore 64® and Atari® home computers. $16.00/$21.00

Available at leading computer and hobby stores everywhere, or call toll-free: **(800) 638-9292** for a store near you. Ask for operator I.

To illuminate the developing mind and spark the creative imagination . . .

AH IQ

Intelligence Quest Software®

Division of **The Avalon Hill Game Company**

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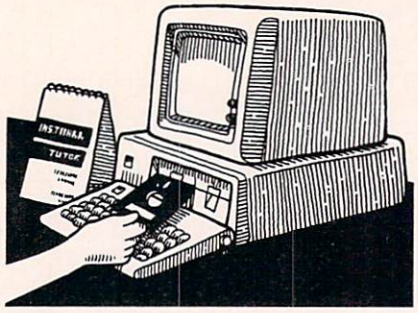

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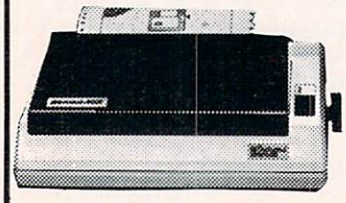

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HOME-SCHOOL CONNECTION

"guess how many bytes are in this computer," and simulated classroom activities). Keep the carnival fun and exciting—perhaps even award prizes (such as copies of student-created programs) for some of the activities.

10. Adult Education. Sometimes we adults—just like our children—prefer a learning environment where we study among our peers. One solution is to schedule an adult-education course for the community through the local high school. The course should be offered free of charge, or for a minimal fee, and should provide an introduction to the world of computing in a relaxed and informative manner.

11. Computer Council. Take advantage of the know-how you have on hand. If you set up an advisory council—made up of both teachers and parents—they can make recommendations on the purchase of hardware or software, and also act as a "clearinghouse" for passing information out to the community. This group, sharing common interests and goals, could put together newsletters, press releases, and other printed information that could be distributed throughout the school district.

12. Computers on Cable. Local cable TV stations are a great way to reach a large segment of the community. Develop a series of video tapes offering an introduction to computer-assisted instruction (CAI) as well as other uses of the computers in the schools. With kids and parents as "stars" in these shows—you'll have an almost guaranteed audience.

Introducing computers to the school community need not be an overwhelming task. It should be based on the idea that the more people know about computers and their role in the educational process the more comfortable they will feel with them; not only in their homes, but in their schools as well. Increased knowledge about computers will be necessary as we move forward—exploring new dimensions and exciting possibilities in education. Of equal importance is the fact that computers become demystified and "friendly" when people learn more about them. The "computerized" partnerships that form between home, school, and community are powerful bonds that can translate into improved academic achievement on the part of each and every youngster. And isn't that a revolution we should all join? FC

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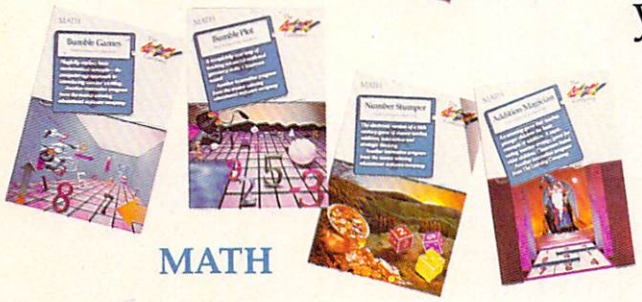

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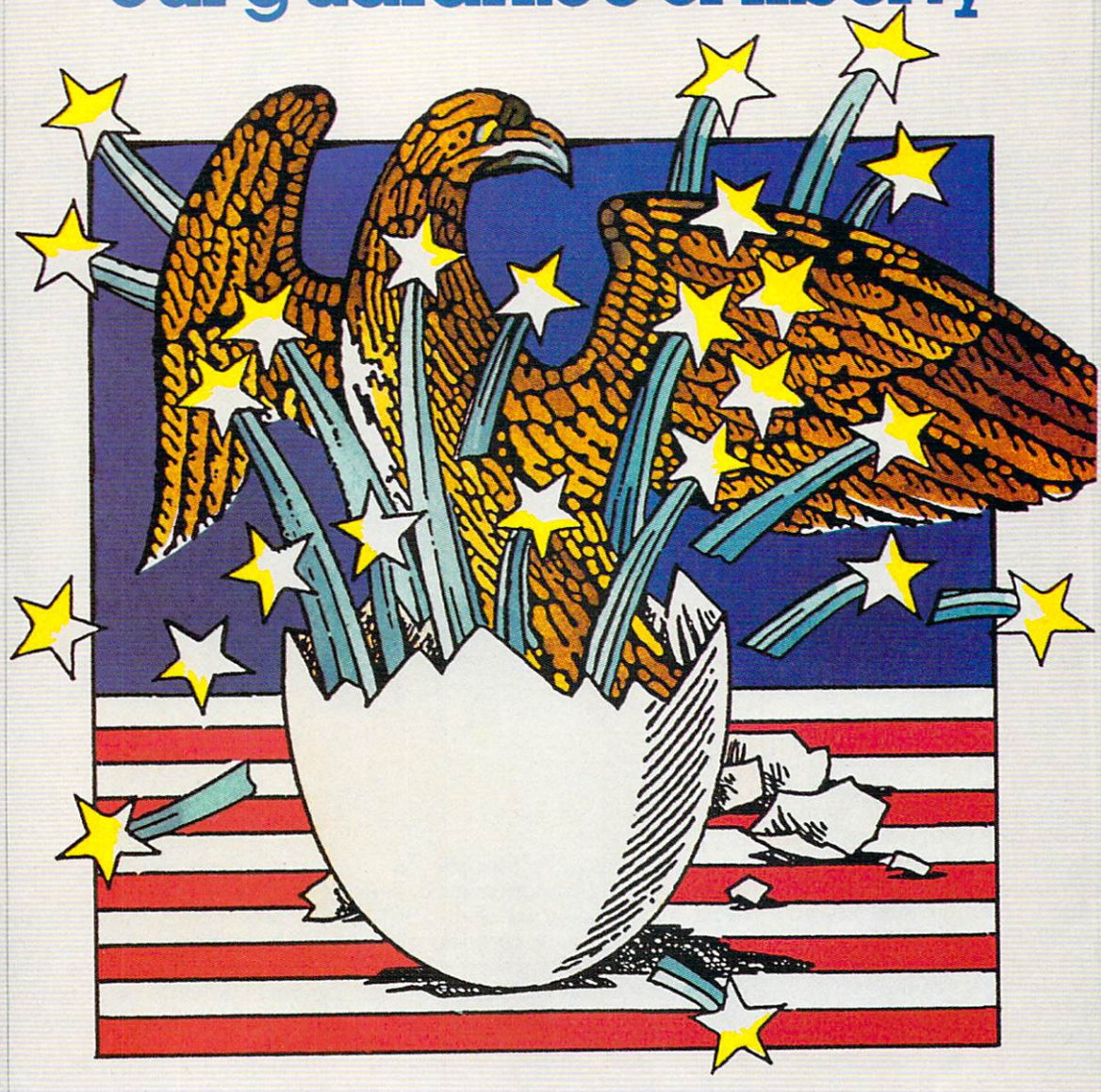

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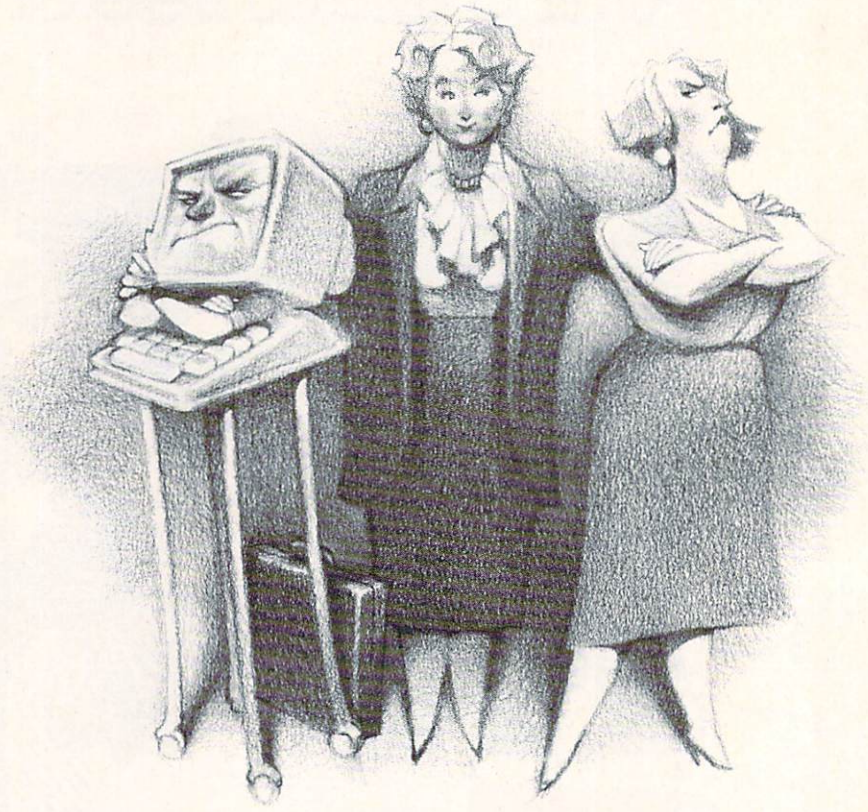
HOME BUSINESS

TUTOR TO GO
In Her Hometown, Kris U'Ren Helps Computer Novices Ages 5 Through 50 Tackle Computing

BY JUNE ROGOZNICA



Several mornings each week, Kris U'Ren grabs an old tote bag, climbs into her 1979 Ford van, and heads out to make house calls. Kris is a country doctor, of sorts, in her hometown of Petaluma, California (population 35,900). Her patients are computer novices; their ailments range from spreadsheet shivers to data-base doldrums to manualphobia. Her speciality is personalized care. She makes house calls, diagnoses over the phone, and if you're a steady client, she bills you later.

Kris runs a computer consulting and tutoring business, called One to One. As the name implies, clients receive instructions on a one-to-one basis—a marked difference from many of the classroom computer courses that have flooded the market. Kris' down-home, door-to-door approach may seem a bit old-fashioned, but her personal touch has made technology a bit easier to swallow for many of her clients.

"I was afraid of the computer," says Elaine Singleton, a 43-year-old One to One student. "She's taken that fear away from me." Elaine turned to computers and Kris to improve the efficiency of the 20-year-old family-run, slaughterhouse business. With Kris' help, Elaine now is using a commercial program for the payroll and is developing an accounts receivable and payable program on her family's Franklin Ace 1200. Before they bought their computer in December 1983, the Singletons contracted out their financial work.

A HIGH-TECH TOOL FOR THE FAMILY

While the Singletons' computing interest may have been unusual a few years ago, it is certainly not today. They are just one of many families trying to apply high-tech tools to their lives—whether in their homes or in their businesses. Not too surprisingly, the lifestyles of these potential computer users vary drastically, as do their needs. Students at One to One certainly prove that point; they are a diversified lot there is no doubt—a kiltmaker, an opera singer, grammar and high school students, to name but a few. For Kris that requires a flexible job description.

"I mold to the market as I go, changing my services accordingly," says the 32-year-old schoolteacher-turned-entrepreneur. There's not very much I won't do." Or, can't do.

Kris does prepurchase consulting for the adults, matching her clients' needs with the appropriate hardware (from joysticks to computers) and software (from word-processing to spreadsheet programs). If they already own equipment or have recently bought new software, Kris will show them how to use their purchases.

Kris usually travels to the homes of her adult students, averaging a six-mile round trip per client. And, she is quick to point out, she rarely refuses a customer based on location.

Unlike the adults she tutors, her younger students have more clearly defined needs which usually can be fulfilled in her home. Some request instructions in beginning BASIC. Or, a student who has fallen behind in class will ask for catch-up assistance. More recently, some high school students have requested help in preparing for the SAT exams. Kris purchased SAT software and has advertised her specialized services to other high schoolers.

Her job description doesn't end there. Kris will bend to her clients'

JUNE ROGOZNICA *is the managing editor of* FAMILY COMPUTING.

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needs—whatever they might be. She'll read and summarize manuals for them. Not too long ago, she even shepherded one client to a computer store to help return faulty hardware. And, at any reasonable hour, she'll take distress phone calls—from current and former students alike.

With such specialized attention and obvious devotion, Kris' rates seem like a real bargain to many of her clients. She charges just $12 an hour for lessons in her home or in theirs. Plus, she gives discounts to those who take more than four lessons in her home. Her prepurchase consultation fees start at $25 an hour.

> "THERE ARE A LOT OF PEOPLE WHO WANT TO USE THE COMPUTER LIKE ANOTHER APPLIANCE. THEY WANT TO TURN IT ON LIKE A MICROWAVE OVEN."

Generally, she spends about 20 hours a week with her clients (mornings with adults and afternoons with children). In addition, she spends one day a week doing library research and countless hours reading machine-specific manuals, computer magazines, and product literature.

GROWING PAINS

Despite its seemingly comfortable niche, One to One has had its growing pains. Since its inception in September 1983, it has undergone an unexpected transformation. What began as a home-based tutoring business for school-age children has turned into a road show primarily for adults. "I thought the greatest percentage of my clients would be children, but I found a tremendous need from adults who already have their own computers." To date, two-thirds of Kris' clients have been women between their mid-30s and early-50s; the remainder have been school-age children.

"Most adults don't want to start from square one. Many have tried classes at colleges and found them boring. . . . It's important for adults to get an immediate response," Kris explains.

Elsie Stuehmeyer, a 50-year-old mother of three, agrees. "I took a computer course through an adult-education program, and it was too basic. They weren't teaching me anything I hadn't found out by myself." But, at the same time, she didn't want to take an advanced class and ask questions that might seem "silly."

"That's why Kris' method is ideal—particularly for the older woman. In a classroom situation, you might feel inferior. . . ."

Elsie originally bought a Commodore 64 for her 10-year-old daughter, but has since used it for her own needs as a coordinator for Scottish Highland dance competitions and for her in-home Scottish kiltmaking business. She and her daughter recently joined a Commodore users' group together.

Surprisingly, more than half of Kris' adult clients, like Elsie, have their own home business. And, with more and more women—particularly mothers—discovering the benefits of computing at home, that market of clients is sure to grow. Not all of the adults have specific business uses in mind, however. Some are looking for general home applications, and still others "just don't want to be left behind."

COMPUTERS—THE MISSING LINK

Kris did not want to be left behind either. That's why she started the business, in part. Her family—a 10-year-old daughter, a 15-year-old son, her husband, and dog, Daisy—were the other part. "Although my kids aren't that young, I like to spend a lot of time with them. But I also want to keep on working."

Prior to starting One to One, Kris taught at a two-room rural schoolhouse near Petaluma. Despite her other interests—coaching and refereeing soccer during the school year, and teaching English as a second language to Japanese students—she felt her life was a bit stale.

Computers, she thought, were anything but stale. The idea of computer tutoring came up when Kris went shopping for a computer with her husband. She quickly recognized a lack of competently trained salespeople. "It was very frustrating," she recalls. "They either couldn't speak English—nontechnically—or they didn't know anything. I thought, 'There are a lot of people who want to use the computer like another appliance. They want to be able to turn it on and use it like a microwave oven.' "

STARTING FROM SCRATCH

With $3,000, no software, no computer, and some programming experience, Kris started her business. She had learned to program in BASIC in college and had used an Apple for teaching at the schoolhouse after graduating with a degree in sociology.

Her first business investment was a Franklin Ace 1000, an Amdek monitor, and an Epson MX-80 printer, for a flat $2,000, "including tax and they threw in the word processor," Kris brags. She chose the Apple compatible because all of the lo-

TIPS FOR TUTORS

1. Obtain a home work permit and business license from your city or town officials. (Be prepared to wade through some red tape.)
2. Be ready to invest money up front for hardware, software, and advertising.
3. Establish good computing rules (for example, no food or drinks near the computer).
4. Subscribe to a variety of computer magazines.
5. Develop a software library based on the needs of your clients. (For example, for children, you'll need educational software including at least one Logo program and a BASIC tutorial. For adults, you should have word-processing, data-base, and spreadsheet programs.)
6. Check out your current insurance policy to make certain you're covered in case one of your clients is injured in your home. (Kris' policy didn't cover accidents related to her business, so she added a rider for an additional $30 a year.)
7. Have your students (particularly children) fill out a standard emergency form in case of an accident or unexpected illness. (Kris has adapted a form she uses as a soccer coach.)
8. Keep flexible hours, particularly when you're starting a new business. (One of the best forms of advertising can be word-of-mouth from pleased customers.)
9. Be patient. Most businesses will not be overnight sensations. But, be assured that with some time, effort, and imagination, you can develop a profitable and productive enterprise.

cal schools use Apples. She spent another $500 purchasing software—mainly educational—since she wrongly anticipated school-age children as her main market.

She was left with $500, which she used to take out a quarter-page advertisement in *Buy-Lines*, a weekly newspaper (circulation 17,000). The ad brought her two clients. Since then she has advertised in local entertainment bulletins. She even hands out and hangs up flyers printed with her Epson. Another important advertising vehicle has been the American Association of University Women, of which she is a member. A lot of the organization's members are active or retired teachers. While most of the members would not use Kris' tutoring service themselves, many have referred friends. About 50 percent of Kris' business comes from word-of-mouth referrals.

> "MOST ADULTS DON'T WANT TO START FROM SQUARE ONE."

PCs AND PERSONAL GROWTH

"Getting clients definitely has been the toughest part of my business. Not because the number of clients is limited, but because I'm not good at selling myself. A lot of self-growth has come from this." When Kris first started tutoring, she was familiar only with her Franklin and Apple computers. Since then she has expanded her hands-on experience to include the Commodore 64, VIC-20, Atari 800, and TI-99/4A.

Her advancements have not gone unnoticed at home. "It's allowed her to expand in terms of her personal growth," says her husband, Bob. "I tried to help her set up books and accounting practices, but she's definitely the computer expert."

Most important, her husband adds, "It allows her the best of both worlds." Those worlds are her family and her career.

THE NEXT STEP

Kris admits she has a lot to learn. She is still figuring out the angles: how to attract more clients, where to advertise, when to charge extra for gas mileage. It's not easy, but she takes things a step at a time. Today? "Well, maybe it's about time I buy a briefcase." FC

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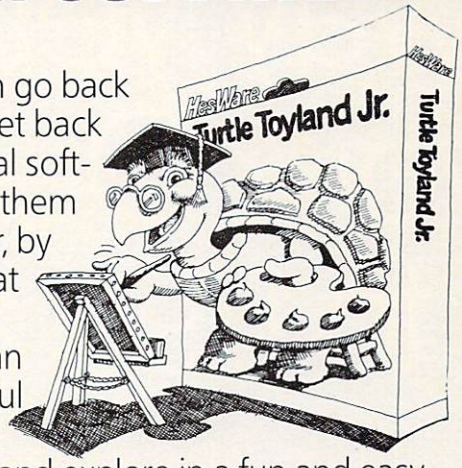

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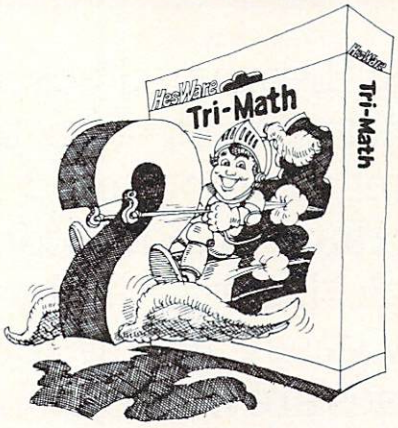

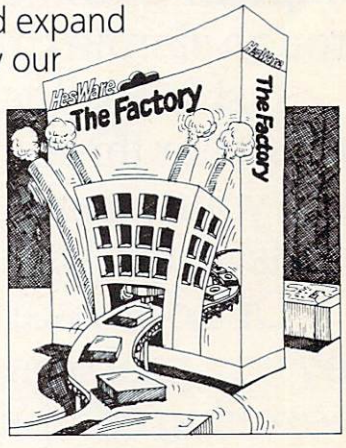

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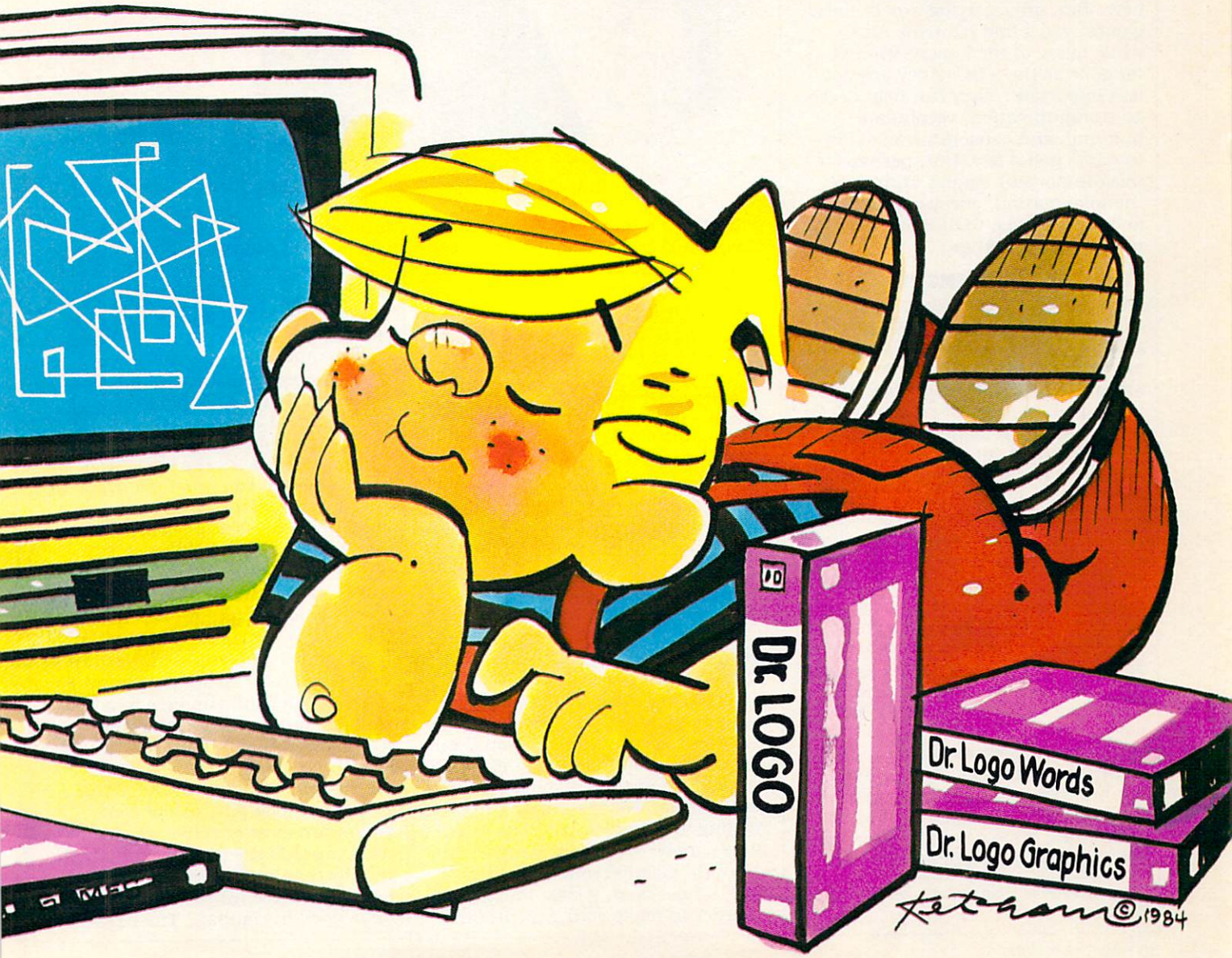
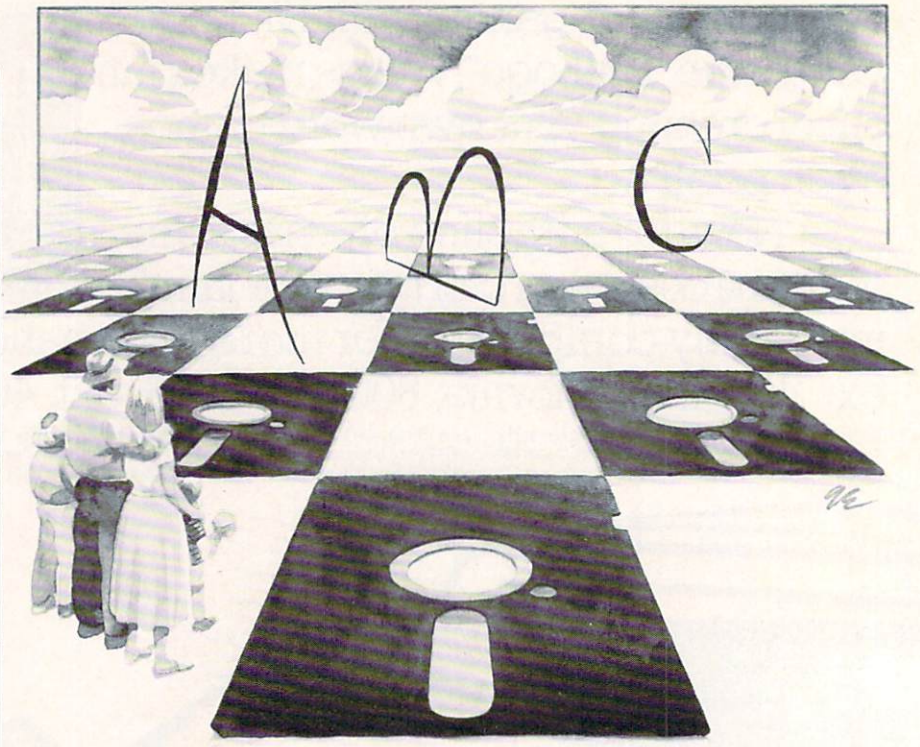


GAMES

THE ABCs OF GAMING
How to Make Learning Fun

BY JAMES DELSON



Next time you're searching for some thought-provoking, mind-expanding material to ease your late summer doldrums, turn to your software library rather than your bookshelves. Skip past the SAT software and typing programs and pull out some computer games instead.

Computer games are not just time wasters. Practically every game we've played has something to offer to the receptive mind, and the best game programs on the market today have true educational value. With names like *Zork*, *Wizardry*, and *Flight Simulator*, that may be difficult to believe. But, after playing one of these games, you'll find it's true. And while many of the lessons are not as tangible as the ABCs, they are not less important. They can help develop communication, vocabulary-building, and concentration skills—to name just a few. But, perhaps most important, games stimulate the imagination, encouraging kids, and even adults, to discover new interests and activities.

THE LEARNED LINEUP

I have chosen one game in each of the leading genres to illustrate programs with educational value. These are certainly not the only ones around—they are just my favorites. If you look at my past reviews in FAMILY COMPUTING, you'll find quite a few others; and, of course, keep your eyes open for new games being released.

Word Games: Word games like *Word Challenge* (Hayden Software) can qualify as both game and educational software. Match wits against the computer to see who can make the most words out of a set group of letters, and in doing so, combine spelling and vocabulary-enlargement skills with the pressure of a time limit. Some might even call it homework.

Financial Games: *Cartels and Cutthroats* (Strategic Simulations, Inc.) is currently used in several colleges to teach the basic elements of economics. It's a complex game, involving players in financial planning (with the aid of a built-in spreadsheet program) and money management (good for those sticky discussions about allowances), with the added bonus of teaching players about the GNP, the ups and downs of supply and demand, and a host of other business topics.

Historical Adventures: *The Seven Cities of Gold* (Electronic Arts), one of 1984's most innovative games (written by the same team that created *Cartels and Cutthroats*), offers players the chance to better the achievements of the Spanish Conquistadors in the Great Age of Discovery. Put together an expedition (there's that money management again), sail to the New World, and by peaceful or military means enrich the treasury of your king. Though some players may enjoy slaughtering the local populace, the game encourages peaceful coexistence in a very real way: If you don't make a lot of treaties, not only will you end up poor, but you'll probably end up dead. Navigating and map-reading are supplemented by learning the necessity of planning in advance (to balance your expedition's food, ships, men, goods, and gold) in order to make your expedition a profitable one. A natural bonus of playing this type of game is the supplementary reading one undertakes, from historical fiction (*Captain from Castille*) and drama (*The Royal Hunt of the Sun*) to more advanced commentary and references in historical atlases.

Trivia Games: *Quizagon* (Springboard Software, Inc.) is not exactly the board game Trivial Pursuit, but the idea's the same. Call up those facts you've stored away in your memory banks and test your knowledge in several fields, which might be quite useful come PSAT/SAT time.

War Games: *Knights of the Desert* (Strategic Simulations, Inc.), a historically accurate simulation of World War II campaigns in North Africa, teaches far more than armored combat. Fuel and supplies must be rationed out to enable your side (German or Allied) to move and fight at your command. Your playing pieces, which represent the actual units that took part in the campaign, are most effective when applied towards the purpose for which they were intended. (For example, reconnaissance units are not meant to be used in combat.) The basics of

JAMES DELSON *is* FAMILY COMPUTING*'s games critic.*

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strategy and tactics, properly understood, can help towards the management of other areas in one's life, such as scheduling time and learning to organize one's thoughts. In addition, as in historical games, further reading generally follows if the subject matter is properly presented.

Arcade Games: *Decathalon* (Microsoft)—an educational program? To play this particular game, you have to learn persistence, concentration, depth perception, hand-eye coordination, memorization, and timing. Naturally, not all arcade games are this useful.

Political Games: *President Elect* (Strategic Simulations, Inc.) simulates the final weeks of a real or hypothetical presidential campaign between 1960 and 1984. Like *Cartels and Cutthroats*, it is widely used as an instructional tool in schools across the country. It teaches such subjects as America's political process, debating, electioneering, money management (through campaign spending), the Electoral College system, and even geography (at each turn the player has to study a map of the U.S.).

Construction Sets: *Pinball Construction Set* (Electronic Arts) is one of the most flexible games in existence. It can be used to teach the principles of computing to youngsters with its clear, easy-to-understand graphics menu and a handy cursor which can be made to point to various graphics on the screen. In other areas it helps define such hard-to-grasp ideas as the force of gravity (which can be altered here) and Newton's laws of physics. On top of all that, it's really fun to play in a family group, encouraging creativity in forming shapes and colors when assembling new playing fields on the pinball table.

Text and Text Graphic Adventures: The text-adventure genre is probably among the most stimulating. The games combine strategy and communication skills as you talk to your computer to achieve a goal. (It's like trying to communicate in a foreign language.) *Suspended* (Infocom, Inc.) may be one of the best examples. It combines science fiction (you are in a suspended state of animation) and automation (you must operate six robots to sustain life on the planet). The game makes players deal in abstract ideas, reason through puzzles, and put together clues to come up with logical answers to illogical situations. It develops the imagination while allowing the gamer to create alternative solutions to exiting problems.

Simulators: *Flight Simulator* (Microsoft Corp.) has been, since it first came out well over 18 months ago, the most sophisticated "game" on the market. It has been approved as a tool for the teaching of flight instruction and offers the opportunity of experiencing the "feel" of flying with none of the costs or risks of the real thing. Learn to taxi, take off, land, navigate with instruments or a map, read the flight instruments and, if you're good enough, go on to play a World War I dogfight simulation.

Sports Games: *Julius Erving and Larry Bird Go One-on-One* (Electronic Arts) is a simulation of basketball, created by a programmer with the assistance of two of basketball's greats. Like other sports games it teaches the basics of the activity while offering practice in coordination, timing, and quick thinking. Most important, though, it emphasizes the need for fair play by penalizing the players for fouls.

Role-playing Adventure Games: The *Wizardry* series (Sirtech Software, Inc.) consists of three games: *Proving Ground of the Mad Overlord*, *Knight of Diamonds*, and *Legacy of Llylgamyn*. They are exciting and compelling games in which players create characters who experience fantastic adventures (that's why it's called role-playing). You find your way through mazes, search for treasure, and conquer evil villains. *Wizardry*'s creators oblige players to use their initiative, work cooperatively and, in effect, make life-and-death decisions for their heroes and heroines. Other advantages in the educational vein include advanced map-making techniques, sophisticated puzzle-solving, and careful record-keeping (remembering how monsters were defeated the first time), as well as the historical values of further study in medieval history and fantasy.

SOFTWARE MANUFACTURERS

ELECTRONIC ARTS, 2755 Campus Drive, San Mateo, CA 94403; (415) 571-7171. *Julius Erving and Larry Bird Go One-on-One* available for Apple, 48K (disk); Atari Home Computers, 48K (disk); and Commodore 64 (disk); $40. *Pinball Construction Set* available for Apple, 48K (disk); Atari Home Computers, 48K (disk); and Commodore 64 (disk). Version planned for IBM PC/PC*jr*; $40. *The Seven Cities of Gold* available for Atari Home Computers, 48K (disk) and Commodore 64 (disk). Version planned for Apple; $40.

HAYDEN SOFTWARE, 600 Suffolk St., Lowell, MA 01853; (800) 343-1218. *Word Challenge* available for Apple, 48K (disk) and IBM PC/PC*jr*, 64K (disk); $39.95.

INFOCOM, INC., 55 Wheeler St., Cambridge, MA 02138; (617) 492-1031. *Suspended* available for Apple II and Macintosh, 48K (disk); Atari Home Computers, 48K (disk); IBM PC/PC*jr*, 48K (disk); TI-99/4A; 48K (disk); and TRS-80 Models I/III, 48K (disk); $49.95.

MICROSOFT CORP., 10700 Northup Way, Box 97200, Bellevue, WA 98009; (206) 828-8080. *Decathalon* available for Apple II/II plus/IIe, 48K (disk). Version planned for IBM PC/PC*jr*; $29.95. *Flight Simulator* available for IBM PC/PC*jr*, 64K (disk); $49.95.

SIR-TECH SOFTWARE, INC., 6 Main St., Ogdensburg, NY 13669; (315) 393-6633. *Knight of Diamonds* available for Apple II series 48K (disk); $34.95. *Legacy of Llylgamyn* available for Apple II series, 48K (disk); $39.95. *Proving Ground of the Mad Overlord* available for Apple II series, 48K (disk); $49.95 and IBM PC/PC*jr*, 64K (disk); $59.95.

SPRINGBOARD SOFTWARE, INC., 7807 Creekridge Circle, Minneapolis, MN 55435; (800) 328-1223. *Quizagon* available for Apple II, 48K (disk); Commodore 64 (disk); and IBM PC/PC*jr*, 64K (disk). Version planned for Atari; $39.95.

STRATEGIC SIMULATIONS, INC., 883 Stierlin Road, Bldg. A-200, Mountain View, CA 94043; (415) 964-1353. *Cartels and Cutthroats*, for Apple II, 48K (disk); $39.95. *Knights of the Desert* available for Apple II series, 48K (disk); Atari Home Computers, 40K (cassette), 48K (disk); Commodore 64 (disk and cassette); and TRS-80 Models I/III (cassette); $39.95. *President Elect* available for Apple II series, 48K (disk); $39.95.

EDUCATING THE GAMER

Computer games can be fun—of that there's no doubt. But, they also have numerous benefits that are not quite so obvious. Like their educational value, for instance. If you're doubtful, boot up a disk, such as *The Seven Cities of Gold*. Now, what could be more educational than trying to figure out how much food you will need to survive on your long journey to the New World? And, what could be more fun? FC

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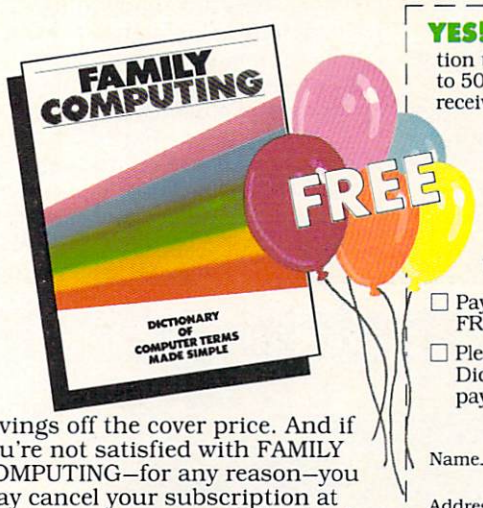

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TELECOMPUTING

FROM THE REDWOOD FORESTS TO THE GULF STREAM WATERS . . . People Are Gathering Together on National Networks

BY P. GREGORY SPRINGER

Inside several suburban Ohio buildings a constant flow of discussion arrives over telephone wires from computers in homes across the country. These words pass through 32 mainframe computers and are then sent back out again onto computer screens.

These buildings are the headquarters for CompuServe, one of several national telecomputing networks in the United States. Based in Columbus, Ohio, CompuServe is one of the largest in the country, adding more than 1,500 new subscribers every week. One of the oldest (and it's only 5 years old) is The Source, headquartered in McLean, Virginia. One of the newest entries into the field is Delphi, located in Cambridge, Massachusetts.

Each national network provides a different mix of services, but at heart they are all the same. In order to access a network's computers you have to pay a subscription fee. Once you are a subscriber with your own user number and private password, you can call the network day and night using your computer, modem, communications software, and telephone line. You will be charged an hourly rate for time on-line, in addition to the cost of the telephone call.

Once on-line, you have menu after menu of options to select from. You may choose to scan the latest news or sports updates, buy things, play games, obtain programs, post questions and receive answers, etc. Perhaps the most exciting service that these national networks offer is the opportunity to conduct "live conversations" with other users of the system. By merely typing words onto your keyboard, you can read—within seconds—the replies of people across the country directly on your own computer screen.

Why should you pay to use a national network when you can use a bulletin board for free? The primary differences between a national network and a bulletin board (*see "Choosing Your First BBS" in the August* FAMILY COMPUTING) are size and power. Many people can use a national network simultaneously, unlike a BBS, which generally operates over a single telephone line, limiting it to receiving one call at a time. And most BBSs operate from a single home or office computer, and therefore can't provide the variety or volume of information that a national network is able to store on its mainframe computers.

Here are some of the common services that you can expect to find on many of the national networks:

"Live" Conversation offers a subscriber the opportunity to conduct a "visual phone call" (although it's not the other person's face, but his or her words that appear on the computer screen). You may have a choice of two kinds of conversation: private one-to-one communication, or public group discussion. (On CompuServe, group discussion is called "CB," short for Citizen's Band Radio Simulator. You even get to select a name, or "handle," which precedes every comment you type.)

Some great friendships (and even marriages) have developed from the intimacy and fun of the "visual phone call." If you're shy, you can just sit back and observe the group discussion scroll on your computer

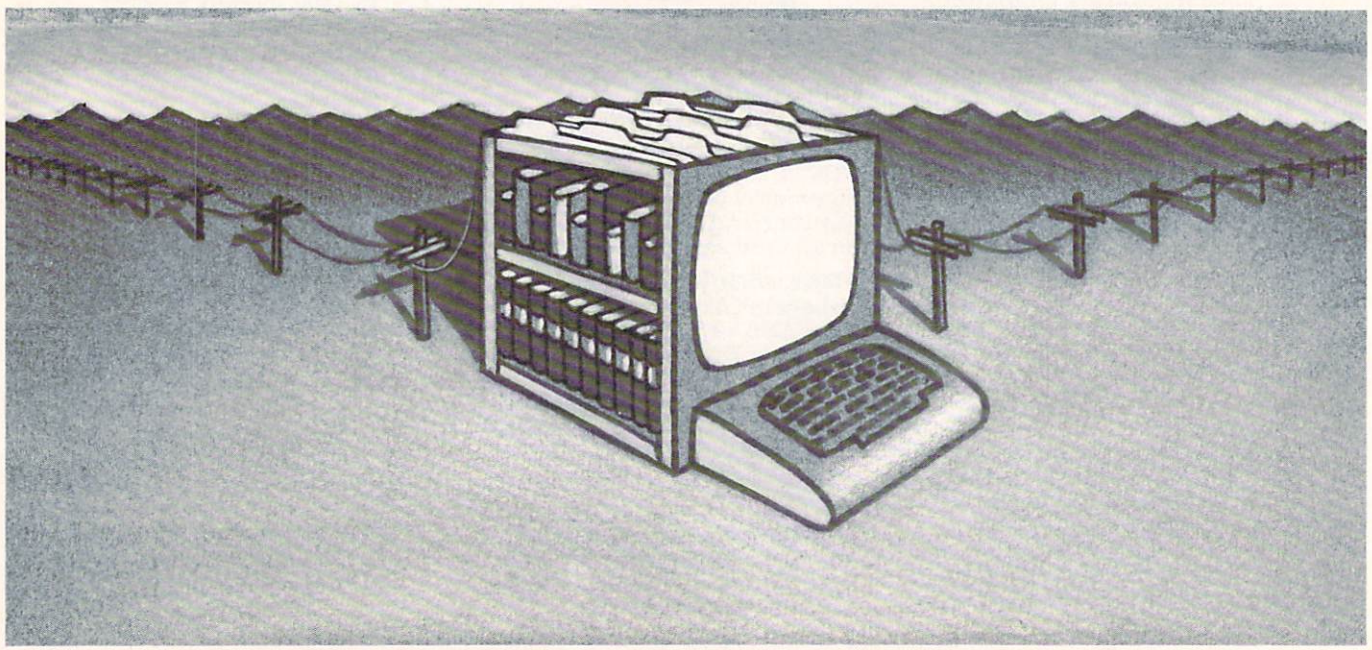

ILLUSTRATION BY BARTON STABLER

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The CB Simulator, where CompuServe Subscribers can Access Friends and Influence People on 72 Different Channels.

Just pick your handle and get on line. From math to matrimony, there's always someone out there who speaks your language. Friends from all over the U.S. and Canada are at it 24 hours a day. Talking tech or just having fun. And if you've got a secret, just use the CB Scrambler. That'll fool the "lurkers," those CB "see it alls" who get their kicks by watching. Or you can always use the private talk mode for guaranteed one-to-one conversation.

The CB Simulator is just one of CompuServe's many electronic communications options that include a National Bulletin Board, Professional Forums and Electronic Mail. Plus, there's a world of on-line information and entertainment all for the price of a local phone call plus connect time.

You can access CompuServe with almost any computer and modem, terminal or communicating word processor.

To receive your illustrated guide to the CompuServe Information Service and learn how to subscribe, call or contact:

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5000 Arlington Centre Blvd., Columbus, OH 43220

800-848-8199

In Ohio call 614-457-0802

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screen. But when you're ready to start "talking," watch out! On-line discussion can become an expensive (and addictive) pastime!

Electronic Mail (or "E-Mail" for short) lets you send private letters to other members of the network. Often, a user will be notified when signing on that a letter is waiting in his or her personal "mailbox."

Bulletins and Messages, as distinct from E-Mail, are public notices you can post on any one of a number of public "bulletin boards" for everyone's perusal. Network bulletin boards are often crowded with advertisements for used computer equipment, announcements of on-line activities, personals, etc.

SIGs (short for Special Interest Groups) let people who share a common interest (for example, Apple computers, gardening, or golf) exchange and receive information in a variety of forms. You can post and retrieve messages on a specific SIG's bulletin board, access hundreds of free programs for your computer model, scan a library of information on a particular subject, and occasionally participate in "live" group discussions among users with the same interests.

News, Sports, Weather, and Stock Market Information can be searched for and read without having to wait for an evening television newscast or a morning newspaper. Some of the national networks offer wire services such as AP or UPI and/or electronic editions of major American newspapers and magazines, as well as the current stock prices.

Entertainment offerings are numerous. You can play a wide variety of games on-line, from the old classics, such as chess, to the modern text-adventure games. You can read a movie review of the summer blockbuster or catch up on the plot of your favorite soap opera. You can have your biorhythm charted, read your horoscope, or take an IQ test. Delphi has something called COLLABORATIVE NOVEL, a project that lets users build upon a growing and surprising work of fiction.

Employment opportunities are posted on some of the national networks, giving you the opportunity to search for available jobs nationwide. You can place your resume on-line, and even get tips on how to write it and what to do in an interview.

Hassle-Free Shopping can be conducted right from your own living room. You can order everything on-line, from chocolates, to books, to computer equipment from major manufacturers and retailers, and often have it delivered to your home.

Travel information lets you plan a trip without leaving your home. Some of the national networks post airline fares and schedules. In some cases, you can even buy your ticket and make seat reservations on-line. Hotel and restaurant guides are also available.

Education services can be found on many of the national networks. Electronic editions of encyclopedias let you search for information by subject or key word and can help students prepare a report. And for the would-be student, college financial-aid information is available.

Remember, this is only a partial listing of the services that national networks provide, and not all will feature each one of these services. Before you subscribe to a particular network, jot down all the services you wish to obtain. Then do some homework.

SOME STARTER NUMBERS:

CompuServe Information Service
CompuServe
5000 Arlington Centre Blvd.
Columbus, OH 43220
(614) 457-8650
CUSTOMER SERVICE: (800) 848-8990
SIGN-UP COST: $39.95; no monthly minimum.
HOURLY RATES: $6 (300 baud, 5 p.m. to 6 a.m. weeknights, weekends, and holidays)
$12 (300 baud, 8 a.m. to 5 p.m. weekdays)
$12.50 (1200 baud, 5 p.m. to 6 a.m. weeknights, weekends, and holidays)
$15 (1200 baud, 8 a.m. to 5 p.m. weekdays)

Delphi
General Videotex Corp.
3 Blackstone St.
Cambridge, MA 02139
(617) 491-3393
CUSTOMER SERVICE: (800) 544-4005
SIGN-UP COST: $49.95; no monthly minimum.
HOURLY RATES: $6 (6 p.m. to 8 a.m. weeknights, weekends, and holidays)
$16 (8 a.m. to 6 p.m. weekdays).
Same rates apply for 300 and 1200 baud.

Source Telecomputing Corp.
The Source
1616 Anderson Road
McLean, VA 22102
(703) 734-7500
CUSTOMER SERVICE: (800) 336-3366
SIGN-UP COST: $100; $10 monthly minimum.
HOURLY RATE: $20.75 (300 baud, 7 a.m. to 6 p.m. weekdays)
$7.75 (300 baud, 6 p.m. to 5 a.m. weeknights, weekends, and holidays)
$25.75 (1200 baud, 7 a.m. to 6 p.m. weekdays)
$10.75 (1200 baud, 6 p.m. to 5 a.m. weeknights, weekends, and holidays)

Prices may change.

Packet-Switching Services:

G.T.E. Telenet
Telenet
8229 Boone Blvd.
Vienna, VA 22180
(703) 442-1000
CUSTOMER SERVICE: (800) 336-0437
HOURLY RATES: Generally none, though it depends on the network.

Tymnet
2070 Chainbridge Road
Vienna, VA 22180
(703) 827-9110
CUSTOMER SERVICE: (800) 336-0149
HOURLY RATES: Generally none, though it depends on the network.

Rates may vary in Canada.

SPECIALTY SERVICES

In addition to these big, popular national networks, there are database systems that aren't so general or generous. Data bases are usually set up specifically for information retrieval and offer an organized file of information on a particular topic. There are at least 1,500 specialized data bases in operation in America today.

A data base can provide you with a great resource of information about a very limited subject. For example, if your local library lacks sufficient information about global energy supplies you could contact a data base called World Energy Information Services at (619) 279-3820. To discover other data bases, a good book to browse through is the *Omni On-line Database Directory*, by Mike Edelhart and Owen Davies, MacMillan Publishing Co., Inc., for $12.95.

Then there are the on-line services that offer many different specialty data-base systems, making them available through one telephone number. BRS/After Dark ([800] 833-4707) offers 12 data bases on science and medicine; five on business and finance; seven on education; and nine on the social sciences and humanities. Dow Jones News/Retrieval emphasises business news, but also includes data bases on movie reviews, an encyclopedia, and other general subject areas. Knowledge Index ([800] 227-5510) offers five data bases on medicine and psychol-

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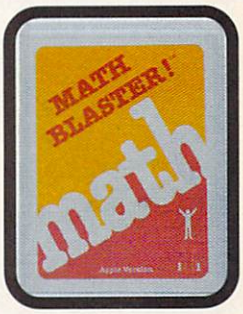

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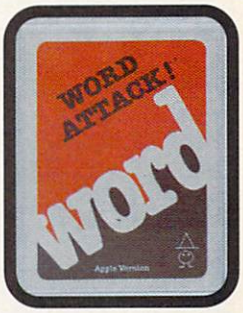

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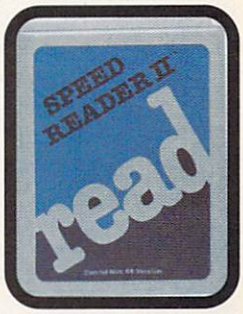

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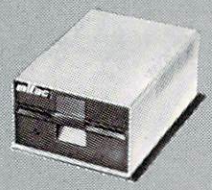

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ogy; five on computers, electronics, and engineering; four on corporate news, business, and legal information; among others. NewsNet ([800] 345-1301) offers 25 data bases on telecommunications, 22 on electronics and computers, and 17 on investments, to name but a few. These services are always adding new data bases.

Remember that specialty data bases usually charge higher subscription fees and hourly rates than do the larger, more general national networks. Before you subscribe, check to see which service provides the information you want, at the lowest cost.

GETTING STARTED

There are various ways to join a national network. You can call one directly using their customer service number, which is often toll free. (*See the accompanying list of starter numbers*). Some of the networks provide trial kits with free hours on the system when you buy a modem or communications software. These kits are also available at many computer stores.

Carefully study the guidebook included in the kit before you log on. It may be a worthwhile investment to purchase a national network's more comprehensive manual before starting (often available by calling the network's customer service number). A network's manual will usually include a more detailed description of services, menus, and commands that can help you to map out your journey on paper before you log on. Remember that national networks can cost from $6 to $25 per hour—depending on the type of service and the time of day you use it—so it is possible to use up all your free hours wandering through menus using trial and error.

National networks usually lower hourly rates during the weekend and evening hours. If you live in a major city, you can often access a national network through a local telephone number, thus cutting down the charges on your phone bill at the end of the month. And if you live in a smaller city, you can still keep your phone bill down by dialing a local "packet-switching" number. A packet-switching service or "value-added carrier," such as Telenet or Tymnet, receives your computer information and then transmits it directly to the national network's headquarters, and vice versa. Neither Delphi nor The Source charges extra for the use of packet-switching, but CompuServe adds an additional $2 surcharge per hour when using Telenet or Tymnet. However, the additional $2 will probably still be less than the cost of a long-distance phone call.

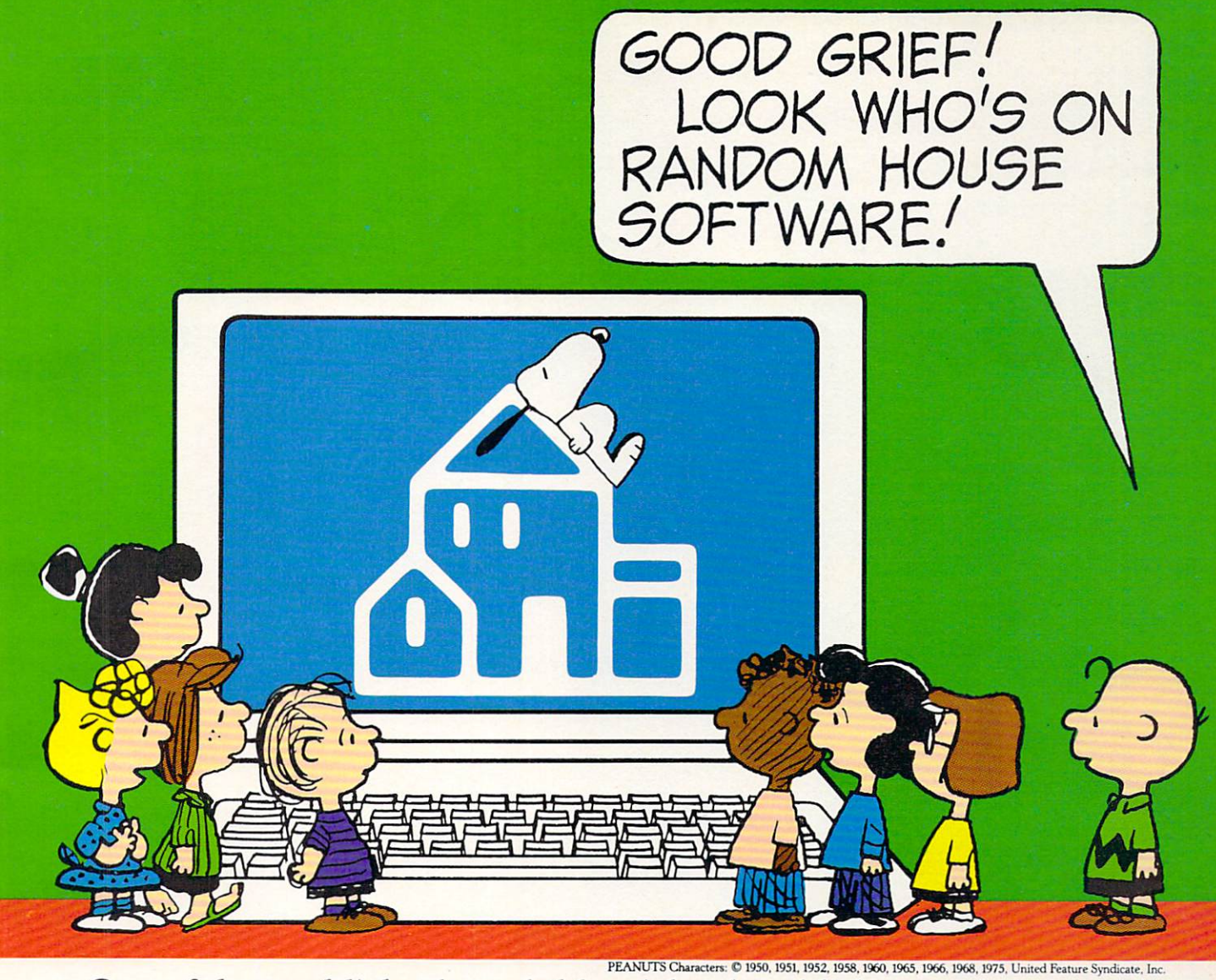
Once you become accustomed to a national network, you can make use of advanced techniques for speeding through and saving time (which translates into money). Some of the national networks sell specialized communications software that provides shortcuts through their system. Sometimes you can get this software for free. (One of the free programs I obtained on CompuServe's Radio Shack Model 100 SIG allowed my computer to dial a phone number, post and retrieve messages, and then sign off, all within a few minutes. I was then free to read the captured messages on my own time, without paying the on-line fee).

Surprisingly, one of the trickiest parts of using a national network may be leaving it. Be sure you learn the sign-off methods before you start, or you may be trapped on the network watching money tick away before your eyes. It's often not enough to just hang up the phone. It may take a network 10 to 15 minutes to realize that you have disconnected yourself, and you will be charged for that time.

The other command to study thoroughly before you start is HELP. The particular HELP command may differ from one network to another, but they all do essentially the same thing: provide you with a menu that can lead you to more specific directions on getting around the system. If you're hopelessly lost, sign off, redial the network, and start over again. And don't forget that you can reach a human voice to ask for help by dialing the national network's customer service number.

New services are being added to the national networks every month (making their manuals and guidebooks quickly outdated). It is the interactive aspect of a national network that gives it this changeable character. And it is your participation and that of other users that makes it continually grow and change like a living thing. FC

P. GREGORY SPRINGER, *a freelance writer from Urbana, Illinois, is the author of a computer handbook for college students called* Electronic Notebook *(dilithium Press). He wrote the August* FAMILY COMPUTING *Telecomputing column.*



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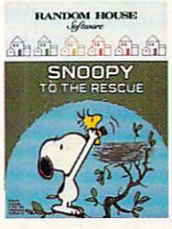
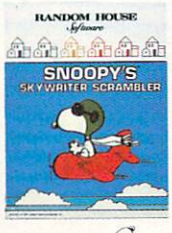
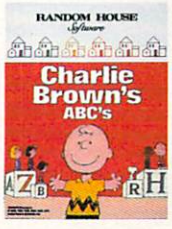
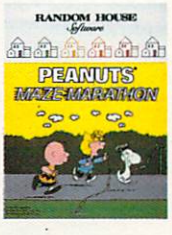
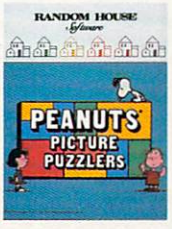
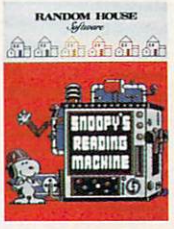








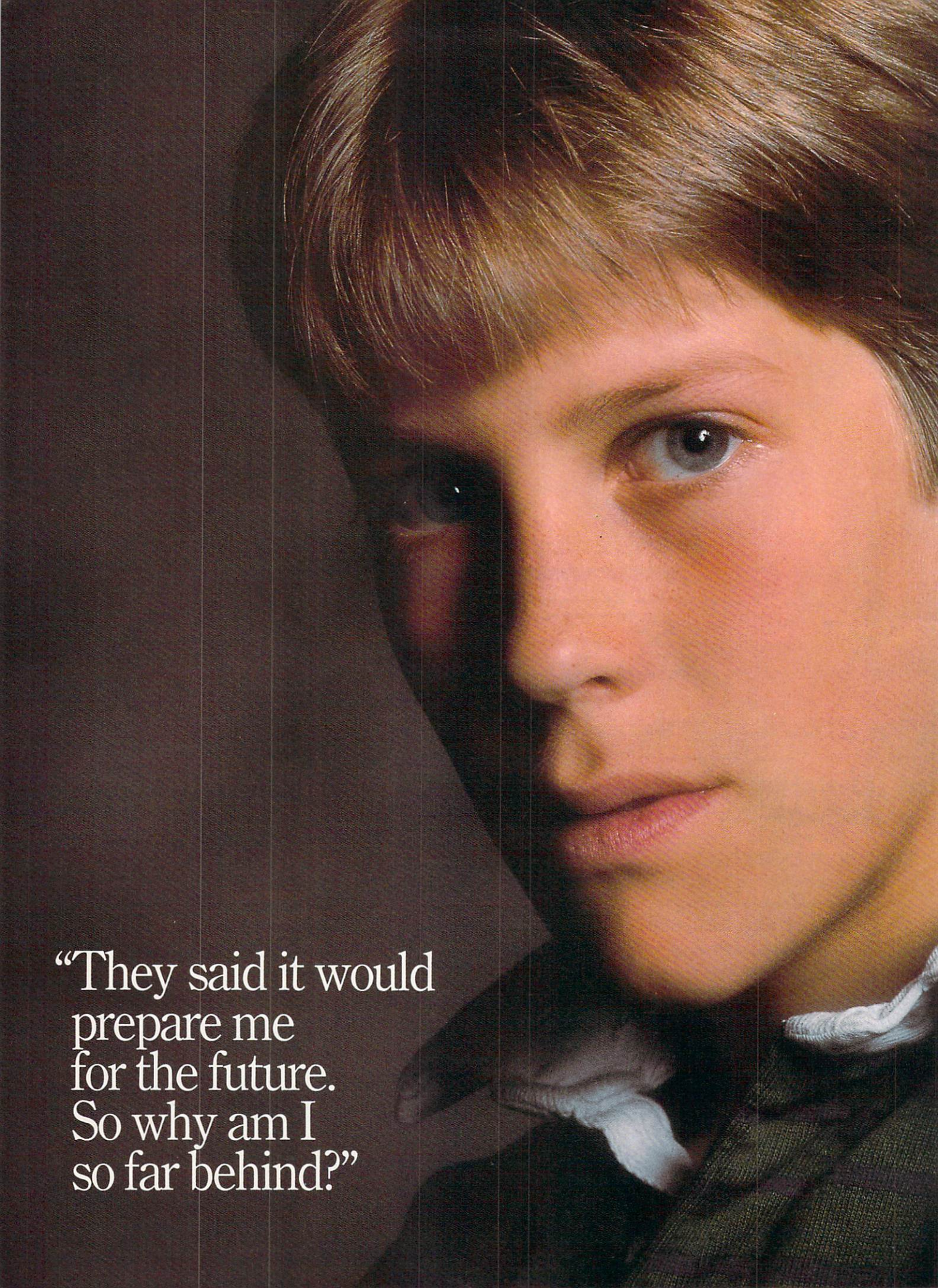




RANDOM HOUSE *Software*

ALL THE BEST FROM OUR HOUSE TO YOUR HOUSE.

†For Apple II+, IIe, IIc. Soon for Commodore 64—disk drive only. (Trademarks of Apple Computer, Inc. & Commodore Electronics Ltd.) © 1984 Random House, Inc. All rights reserved.


"They said it would
prepare me
for the future.
So why am I
so far behind?"

Buying a computer has great potential. But potential doesn't translate instantly into achievement without the right kind of support. Children look to adults for help and guidance—unfortunately that generation came before the computer, making the answers hard to come by.

Brady books, software, and book/diskette packages will help prepare children for the future. Brady Communications Co., Inc., is in business to publish the personal computing books and software with the answers. Readable, contemporary, self-teaching, and fun, books from Brady are the published solutions for personal computing problems. Written by the experts for different levels for the variety of machines on the market, these volumes remove the obstacles and make personal computing a success story...and one success always leads to another.

SMART BASIC FOR THE ADAM
By Bill Searle & Donna Jones

This unique book provides a problem solving approach to programming the ADAM. And, it's written in a self-paced tutorial format which gives you quick, easy and useful results. It shows you where to start, what to do, and how to write better programs. Beginners who don't know BASIC and those who've been busy before with ADAM will find this the most helpful book they can buy.
1984/375pp/paper/ISBN 0-89303-846-6/$11.95

APPLE GRAPHICS ACTIVITIES HANDBOOK
by Harold J. Bailey & J. Edward Kerlin

This is a practical hands-on approach for those ready to learn some sophisticated graphics techniques for the Apple II/IIe and the Franklin 1000/1200. It is written for beginners in a simple straightforward style. Beginning with low resolution graphics, the book moves you through high resolution, two and three dimensional graphics, and memory use until you achieve good graphics skills.
1984/422pp/paper/ISBN 0-89303-308-1/$16.95
Book/Diskette Package/ISBN 0-89303-309-X/$34.95

ATARI USER'S GUIDE: BASIC AND GRAPHICS FOR ATARI 400, 600XL, 800, 800XL and 1200XL
by Mark Ellis, Robert Ellis, & Larry Joel Goldstein

Here is a book to take you by the hand through the fundamentals of BASIC programming and graphics for the Atari 400, 600XL, 800, 800XL and 1200XL. It begins by telling you where to start, what to do and how to write better programs. You'll discover sound and graphics and even learn how to create simple computer games.
1984/268pp/ISBN 0-89303-323-5/$14.95

BRAIN GAMES FOR KIDS AND ADULTS USING THE COMMODORE 64
by John W. Stephenson & Softsync, Inc.

This book combines all the excitement of challenging your mind and the intricacies of math—all while you play. There are 39 games to provide stimulating fun. The book also packs an enormous amount of information in a few lines of code. Although you might be having so much fun you won't notice, you'll be learning a great deal about math and computers.
1984/224pp/paper/ISBN 0-89303-349-9/$12.95
Book/Diskette Package/ISBN 0-89303-350-2/$29.95

JOURNEY TO THE STARS
By Micro Turn-Ons, Inc.

This is an exciting educational program in astronomy to transform your computer screen into a home planetarium. Using high resolution graphics, the software simulates 1400 of the brightest stars in the sky. It is well-written and clearly documented for children or hobbyists with vision.
1984/1 diskette with documentation/ISBN 0-89303-586-6/$49.95

TAKING OFF WITH BASIC FOR THE COMMODORE 64
By Nancy Ralph Watson

This comprehensive, self-paced guide to BASIC programming was specifically designed for youngsters. Created for fun, the "Rocket Take-off" program teaches the necessary elements of BASIC as readers experience countdown, sound effects, and color. Two books in one include 17 supplemental chapters that expand the BASIC concepts introduced in the first chapters. It lists the most frequently used statements and commands with quick reference page numbers and a musical code chart.
1984/196pp/paper/ISBN 0-89303-868-7/$14.95

TURTLESTEPS: AN INTRODUCTION TO APPLE LOGO AND TERRAPIN LOGO
By Pamela Sharp

Turtlesteps is a gentle introduction to LOGO with numerous sample programs and activities. Graphic LOGO concepts are presented in 20 "turtlesteps" and 5 "doublesteps." LOGO, math, science and the arts are integrated for the child in fun. The cover extends to become a handy reference guide to mount near the computer for simplicity's sake. A glossary, an index and appendix complete this volume written by an art educator researching children and computers at Stanford.
1984/256pp/paper/ISBN 0-89303-906-3/$12.95

These books, kits, and software from Brady Communications Co., Inc. are available at fine bookstores and computer dealers nationwide. Or, call 800-638-0220 for information. Brady Communications Co., Inc. is a Prentice-Hall Company located in Bowie, Maryland 20715.

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COMPUTING CLINIC

BUSINESS SOFTWARE FOR THE TI-99/4A • TYPEWRITERS THAT DOUBLE AS PRINTERS • SOUND THROUGH A STEREO • COMMUNICATIONS SOFTWARE FOR THE COMMODORE 64

BY JEFFREY BAIRSTOW

I have a TI-99/4A and am having difficulty finding business software to use in a retail flower shop. I would appreciate your help in contacting someone knowledgeable about accounts receivable, income tax, and other business programs.

MALCOLM GOUDEAU
Ames, Texas

Although the TI-99/4A is a surprisingly powerful computer for the price, the system was not designed with business applications in mind. Consequently, most of the software for the TI-99/4A is for home entertainment and educational applications. I would not recommend attempting to write business software in TI BASIC. That's very difficult for a novice user.

However, Yu/Can Business Software has several business packages for the TI-99/4A designed for use by lawyers, dentists, doctors, and other small enterprises. Yu/Can's *Commercial Billing Plus* package (disk) includes accounts receivable and payable, general ledger, inventory control, invoicing, mailing list, and order entry. It is available by mail from Microdistributors International Inc., 34 Maple Ave., Armonk, NY 10504; (914) 273-6480, and costs $232. There is also Pike Creek's *TI-COUNT*, which is a series of six business packages. It is available for $499 from Triton Products Co., P.O. Box 8123, San Francisco, CA 94128; (800) 227-6900.

You will need an expanded TI-99/4A to run business software. For example, the Yu/Can package requires the TI peripheral expansion system with additional memory, RS-232 card, printer, disk drive, and drive controller card. *TI-COUNT* requires all this, plus the Extended BASIC cartridge, which is also available from Triton.

I have an Apple IIe with a disk drive. I occasionally need to use an 80-column printout. My wife could use a new "memory" typewriter in her legal office. What typewriter should I purchase for her office, with both memory and legal quality print, that I could bring home for word processing?

JAMES S. LONG
Bedford, Kentucky

There are many typewriters on the market that can be used with microcomputers. I would suggest you consider such models as the Olympia Electronic Compact 2, the Smith-Corona Ultrasonic Messenger II, or one of Brother's models. All these typewriters have interchangeable daisy wheels for a variety of letter-quality print styles, and have a one-line memory correction feature.

These typewriters are either portable or at least transportable. Be sure that you purchase a typewriter with an interface (either parallel or serial) to match the one on your computer. You will also need a special cable to connect your Apple IIe to the typewriter. Total price for one of these typewriters should be around $500.

I am using a monitor that does not have sound capabilities with my Commodore 64. What is the cheapest and easiest way to obtain sound for my system?

J.F. STADALSKY
Campobello, South Carolina

The 5-pin DIN cable used to link your computer to the audio/video jacks of your monitor should have two, three, or four output connectors. One, probably white or red, carries the video signal and plugs directly into your monitor. (Sometimes the video signal is carried by two connectors.) Another, probably a black connector, can be plugged into the auxiliary input of a stereo amplifier or receiver to produce the sound generated by the Commodore 64 (or other computers). If the cable won't reach to your stereo, you may need a standard extender cord. If a stereo receiver is not available, you can buy a small, battery-operated amplifier for about $10. In either case, you may also need an adapter to plug your monitor cable into the jack of the amplifier.

Radio Shack stores should be able to supply all the above items.

I have a Commodore 64 with a 1650 Automodem, but I cannot download programs with the software supplied with the modem. Is there a program I can purchase that will allow me to download programs?

SCOTT R. KNAUF
East Meadow, New York

There are a number of terminal programs for the Commodore 64 that are in the public domain and can be obtained through local users' groups. If you do not belong to a users' group, I suggest you contact Tony Ott, 10378 Coburg Lands, St. Louis, MO 63137. If you send him $7 plus a formatted disk and a stamped, self-addressed disk mailer, Ott will copy a full-featured, public domain terminal program onto your disk.

Another program we can recommend is the Commodore 64 version of CompuServe's *Vidtex, EasyComm 64* ($40). It's designed to be used with the 1650 Automodem (and compatibles) and allows the user to upload and download files, save them, autodial, etc. It, too, is a full-featured program. FC

JEFFREY BAIRSTOW, *a technical journalist who lives in West Redding, Connecticut, was a founder and managing editor of* Computer Decisions *magazine. He has also taught math and computer science in England. His family, including two preschoolers, uses a variety of computers.*

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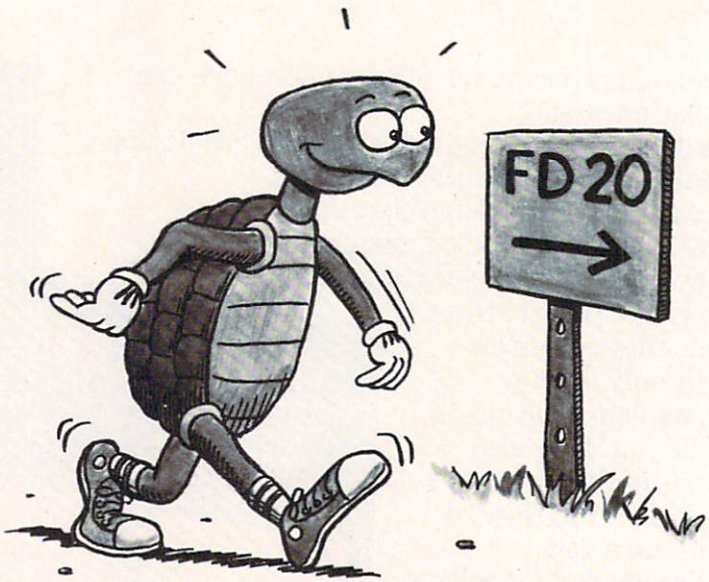
LEARNING LOGO
FROM THE BEGINNING

First of Six Articles

An Introduction to the Powerful Computer Language for Learners of all Ages

BY MINDY PANTIEL AND BECKY PETERSEN



The first day of school has come and gone. Your youngster has just barged in the door, flopped an empty lunch box down on the kitchen table, and handed you a list of school supplies to purchase before tomorrow. She's not quite the same kid you sent off this morning . . . her new shoes are now scuffed and her new dress looks rumpled. But there's a smile on her face.

"So how was school today?" you ask. A flood of responses comes forth. "Guess what? The school got computers over the summer and I'm going to learn to do computers this year. I can't wait. My teacher says we're going to learn Logo and all kinds of neat things like computer programming."

"You're going to learn Logo . . . what's that?"

"Well, I don't know, but it's going to be fun. And we get to use the computers three times a week and I can't wait until it's my turn."

LOGO?

Logo is the computer programming language that's finding its way into more and more elementary schools across the country. Many educators believe it's especially well-suited for helping children explore and discover new ideas. With Logo, the child is in charge of the computer, actually teaching it how to do what he or she wants. Many teachers believe this sense of control is a powerful incentive for learning.

This is the first of six articles designed to introduce Logo to computing beginners of all ages. We think Logo is not only valuable in the schools, but in the home as well. It's an ideal language for families to learn together.

Logo's roots go back to the 1960s and the Massachusetts Institute of Technology, where teams of researchers, led by Dr. Seymour Papert, worked on large "mainframe" computers to develop a computer language for children. The result was Logo. Now there are several different variations of Logo that have been adapted for use on microcomputers. (*See the accompanying article, "Going Logo," for a brief rundown of available Logo packages; a more detailed comparison appeared in the February* FAMILY COMPUTING.)

While Logo was developed for children, it's much more than child's play. This powerful language is capable of solving complex, real-world problems; it even shares some features with sophisticated artificial intelligence languages. While that's beyond the scope of these six beginner's articles, we will at least take note of some of Logo's more advanced capabilities.

TIME FOR TURTLE GRAPHICS

Central to Logo is its so-called "turtle graphics." Using a simple vocabulary of Logo commands, users direct a triangle-shaped "turtle" on the computer screen to make such moves as FORWARD, BACK, RIGHT, or LEFT. The turtle's "footprints" can be used to create designs that are limited only by the user's instructions and imagination.

Here are some more reasons why Logo and turtle graphics are so exciting.

Logo graphics provide immediate visual results. The turtle responds to your commands immediately, so you can see if it's doing what you had in mind. This is a real plus for novices. In addition, the combination of graphic designs, color, and animation tends to captivate children without intimidating adults.

Logo's "modular" structure means that a child can develop one part of a Logo program while her brother or sister develops another and her mother develops a third. Because each task is broken into small

ILLUSTRATION BY BOB SUPINA

MINDY PANTIEL *and* BECKY PETERSEN *of Niwot, Colorado, authors of the new book* Kids, Teachers, and Computers *(Prentice-Hall), are both experienced Logo instructors. They wrote "Learning Logo is a Family Affair" in the February* FAMILY COMPUTING.

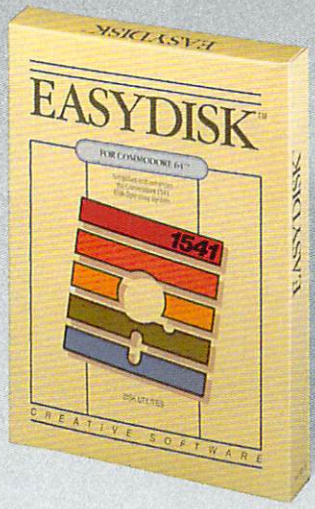
TWO SURE WAYS TO GET MORE OUT OF YOUR COMMODORE 64

I AM THE C-64 provides you with a friendly and patient private tutor. This series is the perfect guide to learning all the power your Commodore 64 has to offer.

- Complete six-volume series.
- Each operation you can perform is explained in simple terms right on the screen; no more struggling with confusing manuals.
- Includes overall introduction to the Commodore 64 and its keyboard.
- Learn BASIC programming language as well as advanced programming techniques.
- Advanced series guides you through music and sound effects and sprite graphics.

EasyDisk eliminates disk based aggravation. It saves time and adds extra features, all at the touch of a key. A must for all Commodore 64 disk drive owners.

- Simplifies the Commodore 1541 Disk Operating System.
- Organizes all the commands in a simple, easy-to-follow menu.
- Allows you to select and execute commands with just a few simple keystrokes.
- Provides full disk backup (using just one drive).
- Doesn't interfere with the normal operation of your computer; it's simply there when you need it.



C R E A T I V E S O F T W A R E

230 East Caribbean Drive, Sunnyvale, CA 94089

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LEARNING LOGO

chunks, which then can be used as the building blocks for larger programs, Logo can show children how to think a problem through, step-by-step. This helps children develop problem-solving skills. It's one of the biggest reasons more and more schools are using Logo.

Despite its apparent simplicity, Logo uses some remarkably complex mathematical ideas. Concepts related to geometry and trigonometry often become second nature to Logo programmers who may not even realize they're learning higher level math.

FIRST: LOGO SOFTWARE

Ready to tackle computer programming with turtle graphics? Not so fast. First, you need to purchase a Logo software package. There are Logo packages available for most computers used in the home. Your family can't program in Logo without one.

All microcomputer versions of Logo offer a screen "turtle" that can be moved around to draw pictures, but the commands, procedures, and capabilities vary. These articles will be based on versions of Logo developed at MIT by Papert and his Logo laboratory. Where MIT Logo varies from other kinds, we'll try to alert you to the differences. In order to get the most out of your Logo software and these articles, keep your users' manual nearby.

As your family learns, share your discoveries with one another. Include not only the end result, but also how it was done. Writing down the sequence of commands on paper often helps. That way, the image can be redrawn on the screen later on. (Later in the series, we will show you how to save your designs on a disk so they can be called back easily.)

LOGO LESSON NO. 1

In our first lesson, we'll meet the turtle on our computer screen; then we'll learn seven easy commands and put them to work creating graphic designs. If you don't yet have a Logo software package, don't stop read-

GOING LOGO: 17 PACKAGES TO CHOOSE FROM

COMPUTER	NAME/PRICE	ADDRESS	BACKUP POLICY
ADAM	SmartLOGO; $100 (data pack)	Coleco Industries, Inc. 999 Quaker Lane S., West Hartford, CT 06110	Replacement free w/in 90 days of purchase
Apple II plus/IIe (64K)	Apple Logo; $100	Apple Computer, Inc. 20525 Mariani Ave., Cupertino, CA 95014	Backup included
Apple IIe/IIc (128K)	Apple Logo II; $100	Apple Computer, Inc. 20525 Mariani Ave., Cupertino, CA 95014	User makes backup
Apple II plus/IIe (64K)	Krell Logo; $89.95	Krell Software Corp. 1320 Stony Brook Road, Stony Brook, NY 11790	Backup included
Apple II/II plus/IIe (64K)	Sprite Logo; $299 (disk and circuit board)	Logo Computer Systems 220 Fifth Ave., New York, NY 10001	User makes backup disk
Apple II plus/IIe (64K)	Terrapin Logo; $99.95	Terrapin, Inc. 222 Third St., Cambridge, MA 02142	No backup provided
Apple II plus/IIe (48K)	Cyber Logo (turtle graphics program); $79.95	Cybertronics International 999 Mount Kemble Ave., Morristown, NJ 07960	For backup copy, send $15 and proof of purchase
Atari Home Computers (16K)	Atari Logo; $100 (cartridge)	Atari, Inc. 1399 Moffett Park Drive, Sunnyvale, CA 94086	No backup provided
Commodore 64	Commodore Logo; $69.95	Commodore Business Machines 1200 Wilson Drive, West Chester, PA 19380	For replacement, send $5 and damaged disk to Commodore w/in 90 days of purchase
IBM PC/enhanced **PCjr** (128K)	IBM Logo; $175	IBM, Inc. Personal Computer Division P.O. Box 1328, Boca Raton, FL 33432	User makes backup
IBM PC (192K), version planned for **PC**/enhanced **PCjr** (128K)	Dr. Logo; $149.95	Digital Research, Inc. 160 Central Ave., Pacific Grove, CA 93950	Backup included
IBM PC/PCjr (64K)	PC Logo; 149.95	Gold Hill Computer and Harvard Associates 260 Beacon St., Somerville, MA 02143	Backup included; user makes copy
IBM PC/enhanced **PCjr** (128K)	Turtle Power (turtle graphics program); $50	IBM, Inc. Personal Computer Division P.O. Box 1328, Boca Raton, Florida 33432	Replacement free w/in 90 days of purchase
IBM PC (128K)	Waterloo Logo; $125	Waterloo Microsystems 171 Columbia St. W., Waterloo, Ontario N2L 575	User makes backup
IBM PC/PCjr (64K)	Ladybug Logo; $10 (public-domain turtle-graphics program)	Young Peoples' Logo Association 1208 Hillsdale Drive, Richardson, TX 75081	User makes backup
Radio Shack Color Computer (16K, 64K versions)	Color Logo; $99 (64K); $49.95 (16K cartridge)	Radio Shack/Tandy Corp. Available through Radio Shack stores.	User makes backup of disk
TI-99/4A (48K)	TI Logo II; $99.95	Triton Products Co. P.O. Box 8123, San Francisco, CA 94128	No backup provided

THE BEST COMES WEST

Quicksilva Computer Games are Here, America!

QUICKSILVA computer games — Britain's most popular — are now available in the United States. They feature high quality graphics with European flair and exciting, imaginative scenarios. Here are two examples out of 19 currently available for Commodore 64™ and/or Timex Sinclair 2068™ computers:

BUGABOO by Indescomp — An exciting adventure game where Bugaboo, a friendly flea, is trapped in a cave. You can help him escape by signaling him to jump from ledge to ledge. Making him hop just the right direction and just the right height is the challenge. If you don't, he'll fall back and you have to begin his escape again. And all the time you must help him hide from the fearsome Pterodactyl and hungry Venus Fly Traps. It's fun, colorful and exciting–you'll develop timing and strategy.

TIMEGATE by John Hollis — The best selling and longest running mega game in England! It's a four dimension, Space-Time Science Fiction arcade adventure. You are the hero. You must pilot the intergalactic battle cruiser, Void-Runner I, through space and time itself, fighting off the evil Squarm to save the Universe. Your ship is equipped with sophisticated systems, full control panel, radar and exotic weapons; but you must develop the skill and spacemanship to use them effectively. It's a challenge, but the safety of the Universe is at stake.

Ask for these and other Quicksilva games at finer stores.

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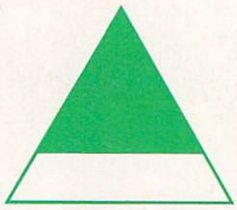
HBJ 1250 Sixth Avenue
San Diego, CA 92101

LEARNING LOGO

ing. You can learn, even if you can't practice.

Once the Logo language disk or cartridge is loaded into the computer's memory (see your users' manual for specific directions), you will see a short welcome message on the screen. At this point, type in the command **DRAW** (on some systems, SHOWTURTLE or **ST**). That puts you in the DRAW mode. A very simple shape appears in the center of the screen. Meet the "turtle":



It's waiting for directions from you—Logo commands. As you give the turtle Logo commands, it can start drawing on the screen. Each new set of commands will direct it to do something.

Here are six instructions you can give it.

- To tell the turtle to move forward in the direction it is heading, use the command **FD** (or FORWARD—you can type it in either way). The turtle will leave a line of "turtle tracks" as it goes. You must add a number to tell the turtle how far you want it to go. For example, FD 20 moves the turtle forward 20 turtle steps. Generally, eight turtle steps equal one inch on the screen. Give it a try.
- The opposite command to FD is **BK** (or BACK). For example, BK 50 moves the turtle backwards 50 turtle steps, leaving tracks behind as it goes.
- The command **RT** (or RIGHT) tells the turtle to turn to its right. RT lets you change the direction the turtle is headed in. This command must be combined with a number of degrees to indicate how sharply you want the turtle to turn. For example, RT 90 would turn the turtle 90 degrees to the right. Most adults know that 90 degrees is a right angle; not all children have encountered this concept. It's not necessary for them to identify right angles in order to use them, however. Through trial and error, they'll quickly learn how much RT 45, RT 60, or RT 360 turns the turtle.
- The opposite of RT is **LT** (or LEFT). Using it along with a number of degrees tells the turtle how much you want it to turn to the left.
- **CS** (or CLEAR SCREEN) erases all lines that have been drawn on the screen, providing a clean workspace on which to start over. The turtle remains where you left it before you cleared the screen.
- **HOME.** This command sends the turtle back to the center of the screen, which is considered to be its home.
- That's all for this month. Now, practice. See how many creative graphic designs you and your family members can come up with. Refer to the accompanying article, "The Family Challenge," for another way to practice these commands.

Next month we'll take a look at a variety of make-it-yourself tools you can use to help your family learn Logo. We'll also introduce you to Logo commands that will give you more control over your turtle. FC

THE FAMILY CHALLENGE

Here's a challenge that will provide practice with the Logo commands you've just learned—DRAW or ST, FD, BK, RT, LT, CS, and HOME.

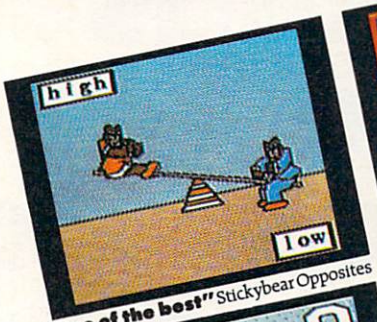
First, have all family members try to make a square. Adults and teenagers should be able to handle this rather quickly, but watch as your younger children wrestle with the problem. (You may need to remind them that a square has four equal sides.) It will take some experimenting on their part, but eventually they will discover that a combination of FORWARD and RIGHT 90 commands will create a square.

With a little help, even your youngest family members—prereaders, too—can master the commands FD, BK, RT, and LT. One helpful strategy for these little ones is to have them "play turtle" by walking out a square first. This helps them relate their own body movements to the movements the screen turtle must make in order to create the same shape. Or have them use a big stuffed animal to make a square shape on the floor. It's especially fun if you have a real stuffed turtle.

Once everyone's discovered a way to make a square, see how many alternative ways they can find to make that same square. Remember there are FORWARD, BACK, RIGHT, and LEFT commands to use. Here's this month's ultimate challenge: Can you put together a series of squares to make more complex shapes like windows and ladders?

EXPERIENCE COUNTS.

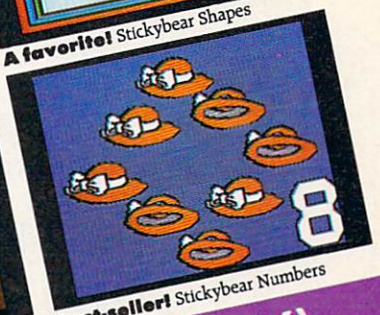
Introducing NEW software from Weekly Reader – education experts for over 55 years!



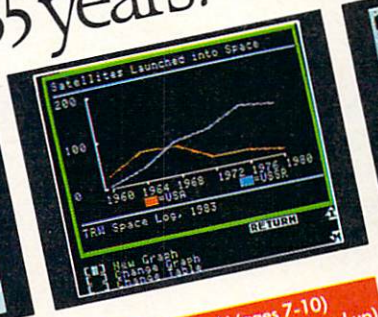
"One of the best" Stickybear Opposites

A favorite! Stickybear Shapes

Award-winner! Stickybear ABC



Best-seller! Stickybear Numbers



NEW!

Exploring Tables and Graphs

Level I (ages 7-10)
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Now the publishers of *Weekly Reader* have turned their best-selling classroom skills program into software for home use. Here's an opportunity for boys and girls to master vital skills so important in today's data-hungry world.

Using fun applications and games, Exploring Tables & Graphs I & II introduce students to the way tables and graphs work and how they're used. Includes double-sided disk, guidebook and line masters. (For use with Apple® computers)

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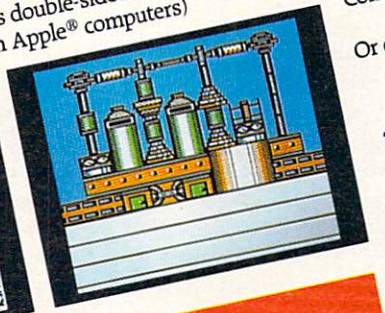
Beginning learners catch on to important basics fast with delightful software created by Richard Hefter, author and illustrator of over 100 children's books!

Recognizing shapes, understanding opposites, counting skills, learning the alphabet...it's easy and lots of fun.

Kids love the vibrant, rainbow colors and animation. Each program includes a hardcover 32-page book, poster and stickers. (For use with Apple and Atari computers. Available soon for Commodore 64 computers.)

Look for our software in finer computer stores everywhere. Or call toll-free 800-852-5000. Dept. AG-3



Pic. Builder™ (ages 8-16)

A unique software picture-building kit that let's imagination run wild while developing important computer skills. Kids can start with the 40 build-by-number pictures on the disk...then go on to create their own pictures! Endless possibilities. Includes 8 separate palettes of 48 building blocks each. (For use with Apple and Atari® computers. Available soon for Commodore 64 computers.)

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TeleLearning: The Computer Brings the Classroom Home

A NEW "ELECTRONIC UNIVERSITY" ALLOWS YOU TO LEARN IN YOUR OWN LIVING ROOM

BY ROGER SCHULMAN

When a student registers for a college course, it's usually a routine event. But recently, when Robert Cugini signed up to take Freshman English through Edison State College in New Jersey, he was scrutinized by no less than 50 journalists and educators, and the affair was recorded by five television cameras. In front of this audience, Cugini became the first student of the first "electronic university." His lessons, homework assignments—even the occasional chat with his professor—would all be completed at home on his Commodore 64. "I'm finally going to get to go to college," said 27-year-old Cugini, a double amputee who found it too fatiguing to hold down a job and commute to school on his two artificial legs. "This is unbelievable."

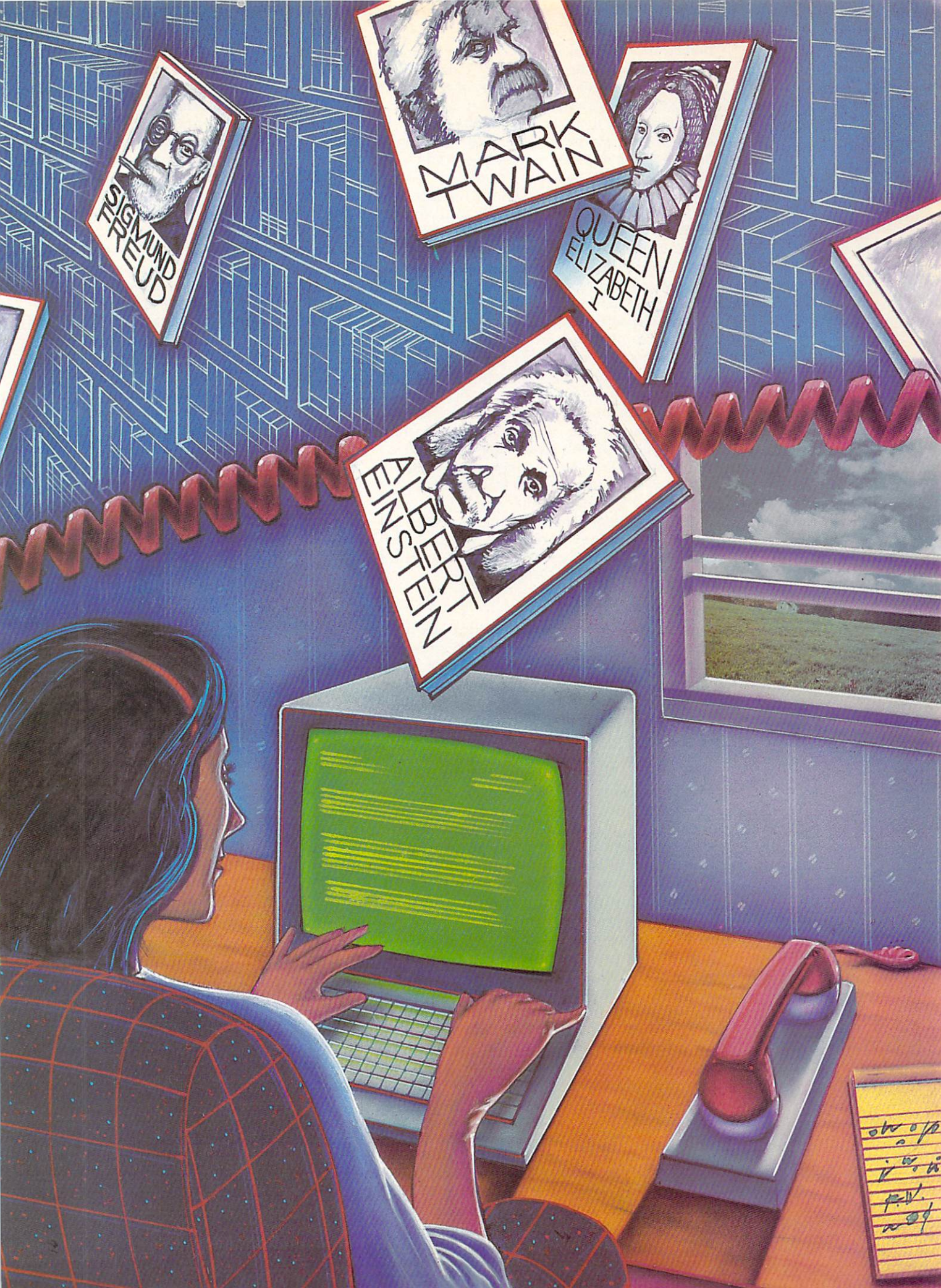
Cugini's surprise was understandable. Until recently, it was impossible to use a home computer to get traditional, one-on-one instruction in reading, writing—or anything else, for that matter. True, educational software enables many computing families to learn at home, at their own pace. But even the best of these programs are no substitute for the interaction between a pupil and teacher. Now, a San Francisco-based firm called TeleLearning is linking teachers and students via personal computers. By combining technological innovation with clever marketing and packaging, TeleLearning has brought the correspondence course into the computer age.

WHAT IT'S LIKE

While sitting at a computer, a TeleLearning student receives a specially designed lesson over the telephone line, stores it on disk, and takes it whenever it's convenient. Each lesson uses the computer to good advantage, proceeding at the student's pace, pausing to ask questions, and using charts and diagrams to explain new concepts. After completing a

ROGER SCHULMAN *is a writer and reporter for* Newsweek *and the coauthor of* Seven Simple Steps for Buying a Personal Computer, *published by Warner Books.*

ILLUSTRATION BY ROY WEIMAN


SIGMUND FREUD
MARK TWAIN
QUEEN ELIZABETH I
ALBERT EINSTEIN

homework assignment, the student sends it electronically to the instructor. A day or two later, the instructor will send back comments about the assignment to the student's electronic mailbox. If there is a special problem or question, the student can arrange to have an exhange with the instructor—live—right over the keyboard. In this way, computer owners who have crowded or erratic schedules, are handicapped or infirm, or simply want to supplement their classroom experience, can learn about English composition, computer literacy, or "Wines of the World" through their computer. Starting this fall they can even earn college credit doing it.

EACH LESSON USES THE COMPUTER TO GOOD ADVANTAGE, PROCEEDING AT THE STUDENT'S PACE, PAUSING TO ASK QUESTIONS, AND USING CHARTS AND DIAGRAMS TO EXPLAIN NEW CONCEPTS.

The TeleLearning system has its problems. The course offerings are nowhere near what was promised. The $120 or more "Knowledge Module" modem the firm sells to be used with its courses cannot be used for other kinds of telecommunicating, such as with CompuServe or The Source. And the courses suffer from some of the disadvantages of any learn-at-home system. Still, TeleLearning represents a significant step forward in computer education. "We believe that TeleLearning has opened up a new avenue in long-distance learning," says Joseph Tucker, associate vice provost of Ohio University, one of the colleges that will be offering courses through TeleLearning.

HOW EASY IT IS

Getting started with TeleLearning is about as easy as making toast. First, you need an Apple, Commodore, IBM, or Compaq computer. Then you must buy a starter kit, which is a package about the size of an unabridged dictionary. The kit contains a looseleaf manual and course catalog, a preprogrammed 5¼-inch disk, and—if you do not already own a compatible modem—one of TeleLearning's slim Knowledge Module modems. The kits can be purchased from about 600 dealers around the country, including VideoConcepts and Tech computer stores, and Macy's and Federated department stores. The enrollment package costs about $100 without the Knowledge Module; prices for kits containing the module range from $219–$229 depending upon the computer you own (*see accompanying box*).

Setting up your electronic classroom takes just a few minutes. Clear instructions guide you through connecting the Knowledge Module and preparing the enclosed disk. The enrollment procedure—the same that Robert Cugini went through—consists of dialing up TeleLearning with your modem and typing in the answers to a few basic questions, such as your name and address. If you want to register for a course at the same time, you can also type in your credit card number, and the disk for the course will be mailed to you. If you prefer, you can register for a course by phone or letter. Course fees range from $35–$100, and include all costs of on-line time. The catalog indicates which books are required for each course; you may buy these on your own, or order them through TeleLearning.

CHOOSING COURSES

As with some conventional colleges, gaining admission to the electronic university is easy, but finding just the right course is somewhat harder. Although Ron Gordon, the chairman of TeleLearning, once promised that he would offer 500 courses by the end of this year, the catalog so far lists only 60 courses. These are not endorsed by any school, but are offered by TeleLearning itself and are taught by instructors—many of them retired or part-time—hired by the firm. Topics range from career development ("Successful Selling Skills,") to personal achievement ("Eating for a Healthy Heart"). You can also study "Principles of Accounting," and "College Composition."

For the family that wants to learn together, TeleLearning offers computer-literacy lessons for the Commodore 64, IBM PC, and the Apple IIe, and courses such as "Reading Aloud to Your Child." (*For a list of other family-oriented courses, see accompanying box.*)

WHAT YOU NEED FOR YOUR "CLASSROOM"

In order to use TeleLearning, you must have the following hardware and software:

1. Apple II/II plus/IIe, Commodore 64, IBM PC, or Compaq portable computer (128K).

2. A monitor, monochrome or color (the display will be monochrome in any case). If you are using an IBM monochrome display adapter card, some graphics may not be displayed.

3. 2 disk drives (1 for the C64).

4. The Disk Operating System (DOS) for your computer.

5. A Hayes Smartmodem 300 or Smartmodem 1200, a Commodore Automodem, the TeleLearning Knowledge Module, or any 300-baud modem that is dialed manually.

6. A telephone with a standard modular telephone jack.

7. A telephone interface, such as the IBM Asynchronous Communications Adapter (or the equivalent for your computer).

The TeleLearning starter kits contain the manuals and the documentation that you need to communicate with TeleLearning. You may also buy the Knowledge Module as part of the starter kit.

For more information contact:

The Electronic University
TeleLearning Systems, Inc.
505 Beach St., San Francisco, CA 94133
(415) 928-2800

None of these courses earns the student credit toward a degree. But TeleLearning is working with at least a half a dozen colleges to offer credit-bearing courses through personal computers. These courses are being designed and taught by college professors and must be taken by arrangement with the schools, just like any traditional college course. Ohio University is developing courses in American history, small business administration, and three other fields. The University of Nebraska at Lincoln plans to offer high school-level courses through TeleLearning; The University of Wisconsin, San Diego State University, Central New England Colleges, and De Anza College in California are also developing courses for the electronic university.

A PERSONAL REPORT

To see what the TeleLearning experience is like, I sent for a starter kit. Since I was writing this article, it seemed appropriate to take several lessons from a course called "Practical Writing Skills for College Students," taught by Miriam Ylvisaker, a teacher and writer with a master's in creative writing from San Francisco State University. Practical Writing began with a couple of gimmicks to catch my attention: an animated graphic of the TeleLearning logo accompanied by the theme from *2001*, and a high-resolution graphic of Ms. Ylvisaker herself. Like all TeleLearning courses, my lessons were divided into three sections: lesson notes (like a teacher's lecture), workbook exercises, and a progress evaluation (everyone knows that means homework).

Once the lessons began, I found the text to be interesting and straightforward without being overly simple. The display did not advance unless I pressed the space bar, allowing me to proceed at my own pace. An occasional chart and highlighted text blocks made the work a bit more fun. Although it took almost two days for my teacher to respond to my first homework assignment, her comments showed careful thought (and helped me write this article!).

The Practical Writing lessons emphasized both the strengths and problems of the TeleLearning system. On the plus side, TeleLearning offers the advantages of any learn-at-home system: a relaxed, familiar environment, class sessions that begin whenever you want, and a sense of individual attention. In addition, TeleLearning courses pack the power of learning by computer, a jump ahead of taking lessons by mail. You can send electronic messages to your instructor in minutes or "chat" with your teacher live. You can repeat a lesson whenever you like and easily make printouts of notes or homework (including charts and boxes). And, learning by computer is just plain fun.

NOT YET GRADE "A"

But the TeleLearning approach falls short in several ways. Although you can communicate with your instructor, there are no provisions for group chats, the kind of round-robin discussions among several students that prove so enriching in the classroom. If you don't care for your instructor, you're stuck—each course is designed and taught by one person only. And the courses could take much better advantage of the computer's power to interact with the student. Aside from the opening graphics, the lessons offer no picturesque animations, no color, they do not make extensive use of sound, and none of the courses has provisions for letting students who own light pens or touch pads use these helpful devices during lessons. Indeed, TeleLearning itself is not content with its first offerings.

"Our first courses aren't to everyone's satisfaction," says Laura Mallone, who assists in the design of the TeleLearning curriculum. "These courses are more of a learning ground for us. We're working on making the courses more student-controlled, less linear."

Chairman Ron Gordon is frank about the cause of the problem. He says he came up with the first batch of TeleLearning courses less to teach, and more to demonstrate to colleges, how well the system works. "Frankly," he says, "you can't sell your razor unless you have razor blades."

It makes sharp business sense: TeleLearning charges colleges a fee for converting their courses for computer transmission, then charges them again when the students use the TeleLearning network. It means that the company is perhaps paying more attention to its work with colleges and less to its own course offerings. So it might be wise for some families—even those not looking to earn college credit—to wait until TeleLearning begins offering more carefully designed courses.

Still, it's worth a visit to a store that offers TeleLearning kits to see if some of the courses already being offered are just right for you. Check the course descriptions in the catalog, including the instructor's credentials. The first lesson to learn before you sign up with the electronic university is an old one: Be a careful shopper. If you are, you'll probably find you enjoy TeleLearning so much, you'll want to give an Apple to your teacher—or maybe a Commodore or an IBM. FC

TELELEARNING OFFERS THE ADVANTAGES OF ANY LEARN-AT-HOME SYSTEM: A RELAXED, FAMILIAR ENVIRONMENT, CLASS SESSIONS THAT BEGIN WHENEVER YOU WANT, AND A SENSE OF INDIVIDUAL ATTENTION.

COURSES FOR THE FAMILY

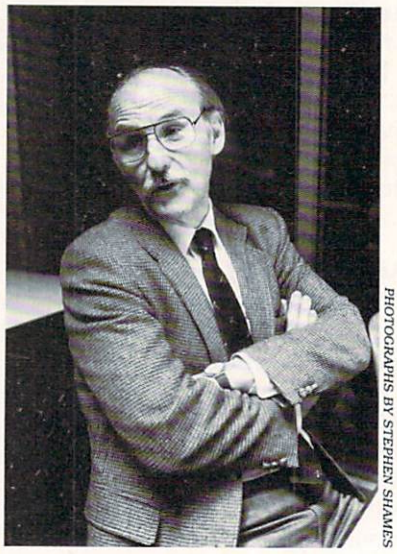
Here's a sampling of some of the courses offered for families who want to learn at home—together.

PARENT POWER: MAKING SCHOOLS WORK FOR CHILDREN
READING READINESS FOR PRESCHOOLERS
GEOMETRY
BASIC MATH SKILLS
VOCABULARY BUILDER
INTRODUCTION TO BASIC PROGRAMMING
READING ALOUD TO YOUR CHILD

21st Century Educator

COMPUTERS COULD SAVE OUR PUBLIC SCHOOLS, SAYS EDUCATION EXPERT KENNETH KOMOSKI

BY BILL CAMARDA



PHOTOGRAPHS BY STEPHEN SHAMES

"The low-cost computer," Kenneth Komoski says, "has the potential to cause something that hasn't happened in my 34 years in education—significant change."

Years before home computers came along, Komoski was already a national leader in the effort to make sure educational materials do the job they're supposed to—help students learn.

He's executive director of the Educational Products Information Exchange Institute (EPIE), a nonprofit group that reviews computers, software, and other educational materials. Under Komoski's stewardship, EPIE recently published The Educational Software Selector, *a guide to more than 5,000 educational software packages. EPIE has also taken the lead in organizing several nationally important computer-education projects.*

Komoski himself has taught in settings as diverse as Nigeria, the Middle East, and in New York at The Collegiate School, where he introduced programming courses in 1961. He is also the father of two grown children, and a 7-year-old.

In his travels, Komoski has developed some provocative opinions—not only about computers, but also about schools, society, and the future. He's got some serious worries. He's also very, very excited.

FC: What's so important about computers?

Komoski: Until now, only a few people in our society have had the ability to combine, to synthesize information, and we've always looked up to them. In an age of information overload, it's essential that more people learn how to do it. Kids growing up with computers have a powerful tool for grappling with information.

FC: Two years ago, only 18 percent of our schools had computers. By next year it may be over 90 percent. How are schools responding to all these computers?

Komoski: Computers have generated an enormous amount of energy in a social institution that has become almost moribund. The schools are being forced to change. There's a foment, a bubbling. I have never seen teachers more willing to invest their own time and money in retraining, and I certainly have not seen parents buying technology for the schools like this. In communities where computers are being introduced cooperatively, they can redefine and redirect public education.

FC: How?

Komoski: For one thing, you have teachers making educational distinctions they never thought to make before. The language of most school materials has nothing to do with learning. "Textbook." "Nonprint material." What do those mean? Nothing. But with computer software, people are talking about drill-and-practice, tutorials, gaming, discovery. Well, these are all legitimate ways of learning. Even data-

BILL CAMARDA *is the associate editor of* FAMILY COMPUTING.

base management—that's a research technique. It's a very healthy change.

FC: You've looked at scores of school systems that have introduced computers. Which ones are most successful?

Komoski: Often, parents take the lead and force schools to bring computers in, but in those schools with real home-school coherence of purpose, it's the school that has taken the lead. The schools should say to the community, "Let's explore the technology together." The most exciting communities are the ones in which everyone realizes everyone else is learning.

FC: Would you agree that the parents should have an important role?

Komoski: Of course. Someone in the school has to say, "This is valuable energy that can strengthen our program." If the schools don't respond to that energy, parents will just turn off.

FC: How ought schools and parents to work together?

Komoski: Schools should train parents. I'm not saying the schools necessarily should have the expertise to do that, just that they need to get it done. In some schools, computer-owning parents are becoming trainers. That's great. Computers can break down the age-old perception that somebody already has all the knowledge and is in charge of disseminating it. Schools should explain to parents how computers are being used with their children. They should encourage parents to buy machines compatible with the ones used in the schools, by arranging with the manufacturers to offer a discount. And they should help parents understand which software can help the kids.

FC: Are there any home-school computer experiments you especially like?

Komoski: One district in Illinois may soon be wired so parents can call up their children's complete academic records on computer—to the point of knowing exactly which skills their children have mastered. Then, of course, the parents can go out and get the software for the other skills.

FC: If you don't have a computer, it sounds like you'll be left out in the cold.

Komoski: Yes. I believe that free public education must now include free access to at least some computer power and electronic communication. You can't avoid that. With what's going on in home computing today, the school can't end at the school-yard fence. The danger is that you're going to have to pay for everything.

FC: How do you bring computers and software to people who wouldn't ordinarily have access?

Komoski: Here's one way: Every FM station has what's called a secondary carrier, a signal that's not picked up on regular radios. You can get a "black box" that picks up this signal, and you can actually broadcast software. You don't have to package disks, you don't have to pay retailers. It's all in the air.

FC: Sounds illegal.

Komoski: No, the state distributes the programs, arranging for royalties with the publishers. In New York there are already plans to do this. Educational radio stations will broadcast the stuff, and in two years there will be a black box in every school in the state. Then any school can hand out software. Or parents can buy the same black box and pick up the broadcasts themselves. An awful lot of adult education could be done that way. The potential is enormous.

FC: You don't like much of the educational software you've reviewed. What could it be doing that it isn't doing now?

Komoski: You can have software that really teaches. If you're working on something, and there's a certain fact or formula you don't understand, a good teacher will notice it and give you some help, maybe some drill-and-practice. Then when you really understand, the teacher can come back out into the simulation or whatever else you were doing.

You should be able to say, "I want my child to be able to do this, give me software guaranteed to teach it."

FC: Isn't that just a theoretical ideal?

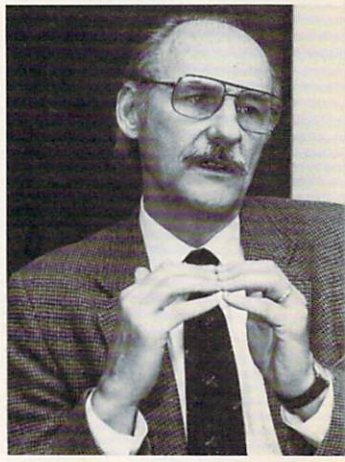
Komoski: No, it exists today in industry and the military. We certainly hope it exists in flight simulators. When we're flying, we expect that our pilot scored 100, not 80, on his flight tests.

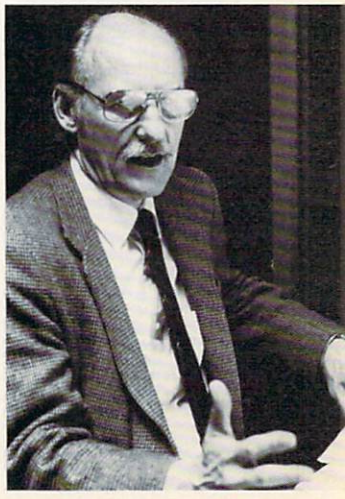
FC: Simulations have gotten a lot of publicity. Are they the best way to teach with computers?

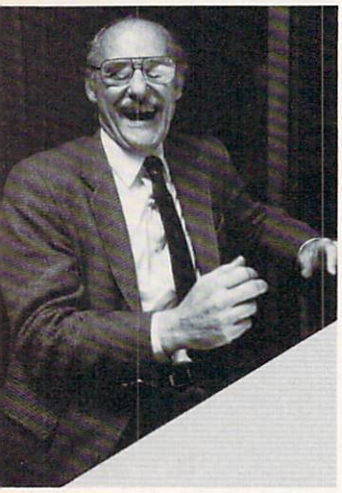
Komoski: There should be an intelligent blending of all the techniques we already have—simulations, drill-and-practice, tutorials, gaming—and other strategies, too. For example, there should be software to help students practice the art of making estimates, educated guesses. Computer programs that can do all these things will begin to resemble artificial intelligence.

FC: Will all this require a whole new generation of computer technology?

Komoski: All you need is enough memory, and with the storage capabilities of the videodisk, you've solved that problem. If I were going into the software business, I'd be doing leading-edge programming based on the videodisk. By the time my product would come to market in two or three years, the technology would not only exist, there would be an installed base. Because the stuff is not going to be very expensive, and everyone will want it.







"YOU HAVE TEACHERS MAKING EDUCATIONAL DISTINCTIONS THEY NEVER THOUGHT TO MAKE BEFORE."

FC: Where do you expect to see these new, very sophisticated programs in the schools?

Komoski: No. 1 is going to be music. Given the capability of the current computer music systems, once you start applying good instructional design theory, you have a lot of power. And it'll be a very nonthreatening curriculum area to teachers, because the average teacher who has to teach music individually just doesn't have the time. If you can give him software that'll help him get these guys to play together in a band, it'll make him look a lot better.

FC: What do you think of entertainment-oriented educational software?

Komoski: What I'd call "edutainment" has become a characteristic of much educational software. There's good edutainment, like "Sesame Street," on TV. But there's also bad edutainment. You can tell the difference by the results. Because of the enormous home market, some companies keep putting out home educational software that's more attractive than it is carefully crafted. If they keep it up, kids may begin to say, "If it isn't fun, I won't bother with it." Designers shouldn't sacrifice motivation, but they should add intellectual protein. At the same time, the school stuff should be much more imaginative than it is. You shouldn't be able to tell the difference between home and school software.

FC: What do you think of Logo?

Komoski: Seymour Papert's view, and that of the Logoists, is wonderful. Every child should start out exploring. Kids can discover an awful lot on their own. The thing is, they can't discover everything on their own. It's inefficient. Instruction is simply learning efficiency, though in many schools it has become learning inefficiency. The kid should explore, get comfortable with the machine; then, at some point you hope he says, "Gee, I want to know *that*. Has someone already got a way of doing it?"

It's unfortunate that you have the Logoists versus the computer-assisted instruction people. Both have to realize there are valuable educational experiences on each side.

FC: You've spent a lot of time talking about the values with which we approach the computer. You think we'd be a lot better off if we were less competitive about it.

Komoski: Take that commercial that says your kid is going to come back fat and unhappy from college if you don't buy a computer. It's saying, "Your kid has to get ahead." Ahead of what? Other kids. I think that parents who approach the computer in this way are communicating the competitiveness to their kids, and making the computer "something you have to do." Then, it's not so much fun anymore.

I wouldn't object at all to advertising that said, "There's so much to learn and the computer is an efficient, exciting way to learn it. Buy a computer and help your child learn as much as he or she wants." That's a very positive message. From that, children can understand that whatever their interests are, they can learn about them, and that is the real goal of education.

FC: Are you finding competitive values in software, too?

Komoski: You can't design software of any kind that doesn't have some values built into it. And the more you lean toward educational software, the more value-laden it's going to be. We need to see more games like *Snooper Troops*, where you're solving a problem rather than competing to see who can blast off more birds, or whatever.

FC: Some kids naturally like to compete around the computer; others like to cooperate.

Komoski: When I watch kids working with Logo, or even word-processing or data-base management programs, I see an extremely natural coming together, sharing, problem solving. I'm delighted, in a way, that there are too few computers in the schools, because it forces social interaction around the machines. We're all so tied together now in this world, we have to learn how to cooperate. That doesn't mean I can't learn more than you, but most of the time, I should put my learning back into the group, to advance everyone's health and happiness.

FC: Going a bit afield, I want to ask you about a comment you once made calling for a moratorium on advanced artificial-intelligence research. Are you a closet technophobe?

Komoski: That comment was somewhat facetious, but it would be useful for us to stop a minute and say, "Well, what do we want these computer systems to do for us?" Because theoretically they will be able to do everything. Maybe we need to decide what we want to keep for ourselves, what is uniquely human.

FC: Could computers help us stake out new, more human ways to live?

Komoski: Fifty years ago, my father was working six days a week at pretty hard labor. When he came home, he made a pass at reading the paper, but in five minutes he was asleep. It wasn't that he wasn't interested, but there simply wasn't the time or the energy. The computer can help generate an enormous amount of wealth without anyone working six days a week. It can give people more time, and then give them more power over what they want to do with that time.

You're not going to know everything but you can select what you will know. With computers, we can create our own reality, each of us, from an information standpoint. We each can become potentially much more our own person. All that, of course, puts more responsibility on the individual rather than less. FC

Software: Does It Make the Grade?

MORE THAN A DOZEN PROGRAMS CLAIM TO HELP STUDENTS PREPARE FOR THE COLLEGE BOARDS. HOW GOOD ARE THEY?

BY JONATHAN WEBSTER

Ethan Dubrow of Los Angeles was one of 1.5 million high school juniors and seniors who took the Scholastic Aptitude Tests last year. His 560 verbal/570 math score was well above average. But it wasn't good enough.

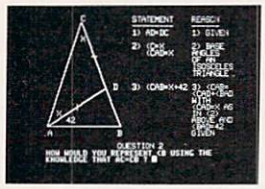
"I was applying for a program that required me to break 1200, with at least 600 on the verbal," he said.

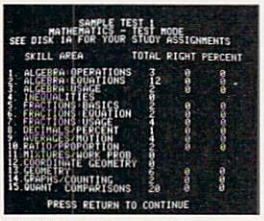
Next time, he decided, he'd harness the power of his Apple II plus computer to raise his scores. So he invested $299 in a six-disk SAT software review package that came with a warrantee: higher scores, or your money back.

When he took the three-hour exam again, a few months later, he scored 1210—with exactly 600 on the verbal portion of the exam. "Not a terrific jump, but not bad," he said. "For me, they delivered on their promise."

Freelancer JONATHAN WEBSTER *of Gloucester, Massachusetts, a high school English teacher and computer user, has written for national and regional magazines, and is coauthor of* The Underground Marketplace.

DIMENSIONAL ART BY ROBIN PETERSON





Digital Research's OWLCAT *(top) includes timing, tells you the correct answer, and gives you a cute message, too. CBS'* Mastering the SAT *(center) includes on-screen math graphics. Barron's'* Computer Study Program For the SAT *(bottom) tells you how you did in 15 different math skill areas.*

Thousands of families are buying SAT software. They have the same hopes and worries Ethan Dubrow had. Can they expect the same results? At least 10 companies now sell SAT packages, and more are on the way. How do you pick the one that's best for you?

CAN YOU PREPARE?

The SATs have become the foremost national standard for comparing college applicants, and many selective colleges count SAT scores heavily in choosing their students. According to the College Board, which administers them, the SATs are designed to predict how well a student can handle college-level work by measuring his or her verbal and mathematical reasoning skills. It's not supposed to be a test of how many facts you know.

The College Board has always viewed SAT preparation skeptically. Still, for years, thousands of students have taken courses, read review texts, and used the College Board's own free materials to study for the exam.

SAT software producers—along with SAT coursegivers and booksellers—say that you *can* prepare for the exam. At a minimum, they say, you can become familiar with the SAT's format, which is somewhat different from conventional tests. For example, the SAT penalizes wrong answers, so sophisticated test-takers won't take a wild guess unless they can improve their odds first by eliminating at least one or two of the choices facing them.

If you're familiar with the test ahead of time, you may be more comfortable at the actual exam. Many testing experts feel that reducing anxiety and instilling "test-wiseness" is a critical factor in improving scores of students of average ability.

Moreover, they claim you can teach some of the fundamental concepts the exam covers. And there is some independent research to show that math scores may respond positively to a review course—especially if the student isn't enrolled in another math course.

WHAT'S IN THE PACKAGE?

All the packages we've reviewed offer drill-and-practice. Drill-and-practice has been the basic building block of all educational systems since the discovery of chalk. It simply means assigning a task repeatedly, and constantly evaluating the student's performance. Needless to say, computers can do this with breathtaking efficiency. There isn't a teacher on the planet with a red pencil as quick as Ms. Micro.

Drill-and-practice, when coupled with an explanation of the student's mistakes, is good for making already learned concepts second nature, for learning vocabulary, and for recalling half-forgotten material. Computerized practice with instantaneous correction is a major selling point for these programs. Many students may be more motivated to work with a package that will do the work of correcting practice questions for them.

THE BASICS

In addition to drill-and-practice, most SAT software packages offer some or all of the following important features. (*For specifics on each program, see accompanying chart and reviews.*)

1. SAT Score Format. Most packages billed as SAT review programs ask the same kind of questions that are asked on the SAT, and present them in much the same way. (Some packages offer a timing feature that tells you how much time you have used or how much time you have left as you take their simulated tests.)

2. Lessons. In addition to drill-and-practice questions, many packages include lessons, explaining important math and verbal concepts in detail. Users may find much of this material familiar, but some of it may be new to them.

3. Strategy Tips. Some packages offer advice on when and when not to guess, how to approach analogies, how to use time well, when and when not to do calculations, and other aspects of SAT strategy.

4. Diagnostics and Study Plans. Some packages attempt to "diagnose" the results of drill-and-practice exercise, and tell the student where he or she needs work. A study program tailored to a particular student's weaknesses clearly makes better use of the time spent on it than one that tries to cure all ills. Some programs also have a PRINT OPTION that allows you to print out your study plan or test analysis.

KEY TO THE CHART

SAT software varies widely in price and features. The chart on the next page, along with the accompanying reviews on the following pages, can help you get your money's worth. Here's a key to the special features listed:

SAT FORMAT? Do the questions resemble SAT questions, and are they scored on the 200–800 scale used by the SATs? While simulated SAT scores can vary widely from the real thing, they are one guidepost as to how well a student is doing.

TIMED? Does the program keep track of how much time you've used, or have left? This may help some students prepare for the time pressure.

LESSONS? Does the program also include extra materials for studying skills covered on the SAT? While short-term study may not help much, students who spend a long period of time in a comprehensive study program are likely to improve their SAT scores.

STRATEGY? Is there advice on which types of questions to answer first, and the like? "Test-wise" students have an advantage.

DIAGNOSTICS? Can the program analyze a student's work and list which areas he or she is weak in?

STUDY PLAN? Based on a student's weaknesses, does the package develop an individual study program using materials included?

PRINT OPTION? Does the program let you print out your study plan so you can refer to it later or while you're using some other part of the program?

TEXT-INDEPENDENT? Are most or all of the questions and review assignments on a disk, not a book? Text-independent systems tend to be less comprehensive, but they can also be much less clumsy.

GRAPHICS? Do the drawings that accompany some math questions appear on-screen? Some students like on-screen graphics, but at times you have to draw the picture on paper anyway to solve the problem.

**Not released in time for review; description based on manufacturer's claims.*
O Optional, at extra cost, or only present in some versions of programs.

SCOREBOARD: COMPARING SAT PROGRAMS

COMPANY/ PROGRAM/PRICE	MATERIALS	COMPUTERS/ MEMORY REQUIREMENTS	SAT FORMAT?	TIMED?	LESSONS?	STRATEGY?	DIAGNOSTICS?	STUDY PLAN?	PRINT OPTION?	TEXT-INDEPENDENT?	GRAPHICS?
***Arco Publishing, Inc.** ARCO'S COMPUTER PREPARATION FOR THE SAT 215 Park Ave. South New York, NY 10003 (212) 777-6300; $69.95	3 double-sided disks: 1 empty record disk with college data base; 528-page review text; 80-page users' guide; 80-page workbook	Apple II plus/IIe (48K)	Y	N	N	Y	Y	Y	N	N	N
Barron's COMPUTER STUDY PROGRAM FOR THE SAT 113 Crossways Park Drive Woodbury, NY 11797 (800) 645-3476; $89.95	3 double-sided disks; 44-page users' manual; 673-page review text; 274-page verbal workbook; 413-page math workbook	Apple II series (48K); Commodore 64; IBM PC (128K)/enhanced PC*jr*	Y	Y	Y	Y	Y	Y	Y	N	Y
CBS Software MASTERING THE SAT 1 Fawcett Place Greenwich, CT 06836 (203) 622-2525; $150	4 single-sided disks; 142-page manual	Apple II plus/IIe (48K); IBM PC/enhanced PC*jr* (128K); Commodore 64	Y	N	Y	Y	Y	N	Y	Y	Y
Digital Research OWLCAT P.O. Box 579 160 Central Ave. Pacific Grove, CA 93950 (408) 649-3896 15-hour package: $89.95 60-hour package: $249.95 PSAT diagnostic disk: $19.95	15-hour package; 4 single-sided disks; 32-page verbal text including users' guide; 53-page math text. 60-hour package: 9 double-sided disks, including PSAT disk; additional *Test of Standard Written English* manual.	Apple II series (48K); Commodore 64; IBM PC/enhanced PC*jr* (128K)	Y	Y	Y	Y	O	N	O	Y	O
EduWare Services, Inc./ Peachtree Software PSAT/SAT WORD ATTACK SKILLS and PSAT/SAT ANALOGIES disks P.O. Box 22222 28035 Dorothy Drive Agoura Hills, CA 91301 (818) 706-0661; $49 each	3 single-sided disks in *Word Attack* package; 2 in *Analogies*; 10-page users' guide	Apple II series (48K); Atari 800 (48K)	N	Y	Y	Y	Y	N	N	Y	N
Harcourt Brace Jovanovich COMPUTER PREPARATION FOR THE SAT 1250 Sixth Ave. San Diego, CA 92101 (800) 543-1918; $79.95	2 double-sided disks (Atari version, 3 disks); 50-page users' manual; 470-page review text	Apple II series (48K); TRS-80 Models III/4 (48K); Commodore 64; IBM PC/PC*jr* (64K); Atari Home Computers (48K)	Y	Y	Y	Y	Y	Y	O	N	N
Hayden Software HAYDEN SAT SCORE IMPROVEMENT SYSTEM 600 Suffolk St. Lowell, MA 01854 (800) 343-1218 Sample Tests: $19.95 Math and Verbal Modules: $39.95 each	Complete System: 12 sides of 8 disks; 3 12-page booklets accompany each module; 16-page guide accompanies sample tests	Apple II plus/IIe (48K); Commodore 64	Y	Y	Y	Y	Y	N	N	Y	Y
Krell Software Corp. COLLEGE BOARD SAT EXAM PREPARATION SERIES 1320 Stony Brook Road Stony Brook, NY 11790 (516) 751-5139 Condensed Series: $139.95 Complete Series: $229.95 Expanded Series: $299.95	Complete Series: 6 single-sided disks; 47-page manual; 64-page guide to college scholarships. Expanded series: Includes additional review materials. Condensed series: Omits Test of Standard Written English.	Acorn (48K); Apple II series (48K); Atari Home Computers (48K); Commodore PET (48K)/ Commodore 64; IBM PC/enhanced PC*jr* (128K); TRS-80 Models III/4 (48K)	N	O	O	N	O	O	O	Y	O
Micro Learn SAT ENGLISH I, II, III SAT MATH I, II, III 2699 Skokie Valley Road Highland Park, IL 60035 (312) 433-7550 $30 per disk	English and Math package include 1 double-sided disk and brief pamphlet with operating instructions	Apple II series (48K); Commodore 64; IBM PC/ enhanced PC*jr* (128K)	N	N	Y	N	N	N	N	Y	Y
Program Design, Inc. PREPARING FOR THE SAT AND OTHER APTITUDE TESTS 95 E. Putnam Ave. Greenwich, CT 06830 (203) 661-8799 $69.95 ($59.95 Atari cassette)	6 single-sided disks (Atari version also available on cassette); 1 audio cassette; 48-page review text; 36-page test-taking strategy guide	Apple II/II plus/IIe (48K); Atari Home Computers (16K cassette, 32K disk)	N	Y	Y	Y	N	N	N	N	N
SEI SAT SKILLS SET 2360-J George Washington Hwy. Yorktown, VA 23692 (804) 898-8386 Verbal Skills Pak: $75 Math Skills Pak: $55 Set: $120	Verbal Pak: 3 single-sided disks; Math Pak: 2 single-sided disks (IBM version, 2 double-sided disks)	Apple II series (48K); IBM PC/ PC*jr* (64K); TRS-80 Models III/ 4 (48K)	N	N	Y	N	N	N	N	Y	Y

EXAMINING EXAMWARE:

Here's a look at 10 packages sold for SAT review, along with a glance at some programs available for other standardized tests. These packages all require a disk drive except for PDI's Atari cassette version.

(*For more details about the SAT packages reviewed here, see accompanying chart.*)

BARRON'S

Computer Study Program for the SAT

Certainly the best value per pound, the Barron's system includes three double-sided disks and three hefty books, including the best-selling Barron's SAT preparation book. Like several of the other comprehensive packages, Barron's SAT program scores a sample test, analyzes the results, and gives the user a study plan. The study plan directs the user to specific sections of two workbooks that cover his or her weak areas, and also to some disk-based practice exercises.

The three review books—1,400 pages altogether—make this an extraordinarily thorough, balanced package. For depth, it certainly beats computer-only programs. But all that printed material can make the system cumbersome, and it may frustrate less motivated users.

CBS SOFTWARE

Mastering the SAT

CBS Software's review package was originally developed by the National Association of Secondary School Principals. It's a balanced program of diagnosis, strategy, and practice in all the math and verbal skills of the SAT.

The package generally runs smoothly, and with a minimum of disk switching. At one point, we had trouble retrieving the right answer to a question we'd answered incorrectly.

The program begins with a full, simulated SAT, including the Test of Standard Written English, which now accompanies the exam. After taking this "SAT" you get a detailed analysis of your strengths and weaknesses. Though you don't get a specific study plan, it's easy to create your own, using the analysis and the disk-based "skill builder" and "vocabulary builder" exercises that are also provided.

CBS' program can store test records for three users. The accompanying 142-page handbook includes test-taking tips and two more simulated SATs.

DIGITAL RESEARCH

OWLCAT (15-hour Version)

OWLCAT comes with several unusual features; some are decorative, others are quite useful. If you want practice in handling the time pressure of the SATs, you can request an on-screen timer. If you get a question wrong, *OWLCAT* may observe, WHO SAID SATS ARE FAIR? There's a disk-based dictionary and a "buddy study" feature, which allows you to compete with a friend.

The math and verbal review is solid, and the extra features may inspire less motivated users. The accompanying books, though not nearly as detailed as some, are well-designed and comprehensible. There seemed to be a frustrating bug on one of my four math disks, however. When I tried to review the results of a drill session, my work was nowhere to be found.

OWLCAT is named after the acronym for the well-known test strategy it uses. (First answer *Obvious Winners*, then eliminate *Losers*, then do *Calculations* and *Attempt* questions that seem difficult but solvable. Only once you've done all that should you try the *Toughest* questions.)

Digital Research also offers a one-disk PSAT diagnostic pretest disk and a massive 60-hour SAT package.

EDUWARE SERVICES/ PEACHTREE SOFTWARE

PSAT/SAT Word Attack Skills and PSAT/SAT Analogies

EduWare's *PSAT/SAT Word Attack Skills* and *PSAT/SAT Analogies* packages utilize some interesting, unusual ideas about SAT verbal review. Based on the prerelease version I saw, however, I think these ideas work better in theory than in practice.

Since more than 80 percent of the words on the SAT have Latin or Greek origins, EduWare's *PSAT/SAT Word Attack Skills* package teaches Latin and Greek roots and prefixes. That way, EduWare suggests, you'll be able to figure out almost any word you don't know. This is a worthwhile language lesson and a useful supplementary strategy for learning vocabulary. But, by itself, it isn't enough. Words are much greater than the sum of their parts.

The *Analogies* disks, sold separately, divide all possible analogies into six categories. But the categories are so general that they may not help all that much at test time.

A sentence-completion disk and a math package will soon be released; when they are, EduWare's SAT series will be complete.

HARCOURT BRACE JOVANOVICH

Computer Preparation for the SAT

Harcourt Brace Jovanovich's *Computer Preparation for the SAT* was the first SAT package to make a sizable dent in the home market. HBJ's test questions come out of a large book that accompanies the program. You can ask the program to time your responses. After you take the "diagnostic" test, HBJ's SAT preparation package scores your results and displays a study plan, rating your strengths and weaknesses and referring you to sections of the book for specific instruction and strategy advice.

The disks also offer 1,000 vocabulary words in "flash card" format. HBJ is not alone in using this technique. As an English teacher, I wonder, however, whether students will do this much memorization.

The program leans heavily on its textbook, which seems exceptionally solid and thorough. The questions are subtle and carefully constructed. Also, if you have a problem making this program work, there's a telephone hot line for users.

HAYDEN SOFTWARE

Hayden SAT Score Improvement System

Hayden's *SAT Score Improvement System* is entirely computer-based—there are no books. The system consists of a math package, a verbal package, and a sample test package each sold separately. For a computer-only system, it's unusually complete.

Each skill section in the verbal package begins with strategies, and, as with Harcourt Brace Jovanovich's package, depends on a 1,000-word vocabulary list.

A "tutor" mode is available for all math and verbal skills. You're given hints, as well as explanations for both right and wrong answers. This is the most complete set of explanations I've seen

THROWING THE BOOK AT YOU

Almost all of these programs rely, to some degree, on printed materials. Text-dependent programs can be awkward and time-consuming, and they hardly show off your computer. On the other hand, if it takes five minutes for your disk drive to find and load the next question, you might prefer that the questions be provided in a book instead. After all, there are no keyboards available on SAT day.

In addition, different publishers offer a grab bag of extra features. We list some of these in the chart, along with their advantages and disadvantages.

We found wide differences in content between packages sold for SAT review. Some offer material simpler than that found on the actual SAT. A few packages contain spelling and grammatical errors that are troubling, to say the least.

Don't expect a simulated SAT to predict exact scores on the actual exam. Sample exams don't get the same exhaustive testing that actual SAT questions do.

DIFFERENT STROKES FOR DIFFERENT FOLKS

Learning styles are as different as fingerprints. One student may thrive on the constant reinforcement and explanation some programs offer; another may find such features a hindrance. The best SAT review system to buy is the one on which the student is willing to spend the most time.

Perhaps the most important thing to keep in mind when purchasing any of these packages is that they won't work unless they are taken seriously, and are used over a sustained period of time. The minimum seems to be about seven or eight hours according to one researcher, though one SAT preparation package takes 60 hours to complete. Ethan Dubrow

10 SAT SOFTWARE REVIEWS

on-screen.

The three-disk math package includes algebra, geometry (with on-screen graphics), and quantitative comparisons. I was, however, unable to get one side of the algebra disk to run.

The two-disk sample SAT package includes two simulated SAT tests and a "pretest," the results of which can be analyzed for strengths and weaknesses in 16 skills.

The Hayden system has its limits: for example, you can't output anything to a printer. But, at $100 for 12 disk sides, it seems reasonably priced.

KRELL SOFTWARE

College Board SAT Exam Preparation Series

For years, Krell's SAT package has been the only one with a guarantee: If you didn't raise your combined verbal and math score by 70 points after using its program, you'd get your money back. (Keep in mind that a gain of 15 to 20 points is average for students taking the exam a second time. And obviously, if you're buying the program to prepare for your first SAT, the guarantee doesn't apply.)

Krell's package gradually eliminates the types of questions you've done well on, and calls up additional questions in troublesome categories. The wrong answers are randomized, meaning that any wrong answer can appear with any question. Real SAT questions include some wrong answers that are carefully designed to confuse test-takers; randomly selected wrong answers won't always do that.

Krell plans to offer optional features including a diagnosis and study-plan system and a vocabulary-builder package.

Since we reviewed Krell's system, the company has reformulated it as three different products: an Expanded Series (Gold Label), with additional review material added (80-point gain guaranteed); a Complete Series (Blue Label, 50-point gain guaranteed); and a Red Label condensed series (no guarantee) without sections covering the Test of Standard Written English.

MICRO LEARN

English SAT I,II,III; Math SAT I,II,III

The complete Micro Learn SAT system consists of three verbal disks and three math disks. Each of these six double-sided disks is sold separately and they each include several kinds of questions.

You can use Micro Learn disks in either a test format or instruction mode. The instruction mode offers hints if you pick the wrong answer. It also explains the correct answer. In some cases, the explanation of right and wrong answers seemed arguable.

Math disks use on-screen graphics and have useful "help" screens that provide background information on each question.

On the Commodore version of *Math SAT I*, we had trouble accessing correct answers to questions that had been answered incorrectly.

PROGRAM DESIGN, INC.

Preparing for the SAT and Other Aptitude Tests

PDI's six-disk package is strong on strategy. It begins with an audio tape introduction to SAT strategy, and includes a separate, 36-page booklet on the same subject. It is not as strong on instructional content.

Some of PDI's drill questions resemble those found on the SATs, while others don't. For example, the program offers practice on number series, which do not appear on the SAT. I thought PDI spent too much time on elementary material. Some students may appreciate the video game-style explosions that accompany each correct answer—others may find them distracting.

There was a recurring grammatical error on one of the Atari disks, as well as a spelling mistake that rendered one correct answer incomprehensible.

The package does not include a sample SAT test. In fact, it suggests that the user buy the Barron's book. The Atari version of the quantitative comparisons disk cannot be used without a joystick. This should be mentioned on the program's packaging, but isn't. PDI also offers an Atari cassette version of this program, which only requires 16K of memory.

SEI

SAT Skills Set

While primarily a drill-and-practice program, SEI's *SAT Skills Set* has several interesting added features.

There is a question editor that enables a teacher or other user to create questions and modify tests—though the resulting modified exams will less closely resemble carefully developed SATs. Wrong answers to drill questions are presented randomly in some sections, similar to the way Krell's program works. While there are no printed instructions, the program is quite straightforward.

The *Skills Set* can also be purchased in two parts. The *Math Skills Pak* consists of two disks and the *Verbal Skills Pak* comes with three disks.

AND, ON THE HORIZON . . .

Even more companies intend to join the crowded SAT software market this fall. Packages from Lovejoy (*SAT College and Preparation Guide*, $79.95; for Apple II series, Commodore 64, IBM PC, TRS-80 Model 4) and Addison-Wesley (*Super Strategies for the SAT*, approximately $89.95; for IBM PC with color card and color monitor) are due for release this month. Also, Arco's *Computer SAT* ($69.95), complete with a data base with median freshman SAT scores for more than 1000 colleges, will soon be available for Apple II/II plus/IIe, Commodore 64, IBM PC, and TRS-80 Model 4.

OTHER TESTS, OTHER SOFTWARE

The SAT is not the only standardized exam you can study for with a computer. Here's a sampler of software available for some other tests:

COLLEGE BOARD ENGLISH COMPOSITION ACHIEVEMENT TEST (ECAT): *Mastering the College Board Achievement Tests: English Composition*, by CBS Software is available for the Apple II series (48K), and IBM PC/PC*jr* enhanced (64K). Five disks, $175.

AMERICAN COLLEGE TEST (ACT): *Computer Preparation for the ACT*, by Harcourt Brace Jovanovich, is available for the Apple II series (48K), $89.95; and the *ACT Preparation Series* by Krell Software, is available for Apple II series (48K), IBM PC/PC*jr* enhanced (128K), Commodore 64, and TRS-80 Models III/4 (48K). "Complete Series" $249.95; "Condensed Version," $119.95.

GRADUATE RECORD EXAM: *Computer Preparation for the GRE* by Harcourt Brace Jovanovich is available for the Apple II series (48K), $89.95

says he spent "an hour here, an hour there" on his package, adding up to 10 hours.

Good study is hard work, and computers haven't changed that. Of course, parents who want to see their children get high board scores will encourage reading and rigorous attention to homework throughout the child's academic career.

Ideally, you should try out a few programs, especially those that offer the broadest range of teaching techniques—drill-and-practice, content instruction, diagnosis, and strategy help in varying amounts.

If you buy a less comprehensive program, someone may need to supervise the student and provide help and guidance when it is needed. Of course, as with any software, be cautious of packages with poor documentation. Be wary of outrageous promises, and be sure your dealer can provide support, as some of these packages contain program bugs.

SOME FINAL, FREE ADVICE

It's highly unlikely that any of these programs will raise a student's score hundreds of points above where it would otherwise have been. A student's experiences in 12 years of schooling are bound to count for much more than the time she or he spends on any preparation program. But if, like Ethan Dubrow, you're looking for a modest improvement in scores, time spent faithfully with a good SAT package may well improve your odds.

SAT software packages can't work magic. However, they can help a student become more familiar and more comfortable with the SAT. They can do the time-consuming work of scoring practice tests and analyzing their results. They may also offer a good approach that students can use in organizing their studying. Any way you look at it, though, it's the student who has to do the thinking. FC

The Secrets Of Teenage Software Stars

Ask a movie star, a corporation president, an astronaut, or anybody else at the top of their profession how they got there, and you're likely to hear about years of grueling training, ruthless competition, great talent, inexhaustible patience, and the eventual lucky break.

So how is it that out of nowhere, a slew of seemingly normal teenagers are winning fame and fortune overnight with their computer programs? Few of them had more than two years of computing experience before their commercial success. They didn't have benevolent uncles in the software business, or access to anything more confidential than a computer reference manual. If you ask them, they'll tell you that anybody with a high school education and a little determination can create marketable software.

COULD IT BE THAT EASY?

A high school diploma and persistence are also all it takes to sell encyclopedias. So there has to be more to it than that. We set out to discover what else these successful teens had in common and to check if what they say is true: that any kid can do it.

Michael Abbot worked in a fast-food restaurant when he was 15 to save enough money

HOW DID THESE KIDS PROGRAM THEMSELVES FOR SUCCESS?

BY MARC BERMAN

to buy his Apple computer. Within about two years, this San Diego kid was programming *Hard Hat Mack* for Electronic Arts, a leading software house. He estimates a hit game can earn the designer up to $100,000. And *Hard Hat Mack* is apparently becoming a hit.

As with many young programmers, Michael's first project was a game he designed just for fun. When his friend, Jim Nitchals, started a software company with some high school buddies, Michael got involved. His first game, which made it to the software shelves at computer stores, eventually came to the attention of the crew at Electronic Arts. They encouraged him to develop another one of his ideas, *Hard Hat Mack*. Michael, now 20, says that while he was working on the game, "I ate, slept, and drank computers." But, he adds, he had no special background in computing, "just your basic math that you're required to take in high school."

THE CALL OF THE WEST

Michael also benefited from being in the right place at the right time. Obviously his program wouldn't have created a stir at Electronic Arts if it didn't show talent, but some young programmers readily admit that geography has worked to their advantage.

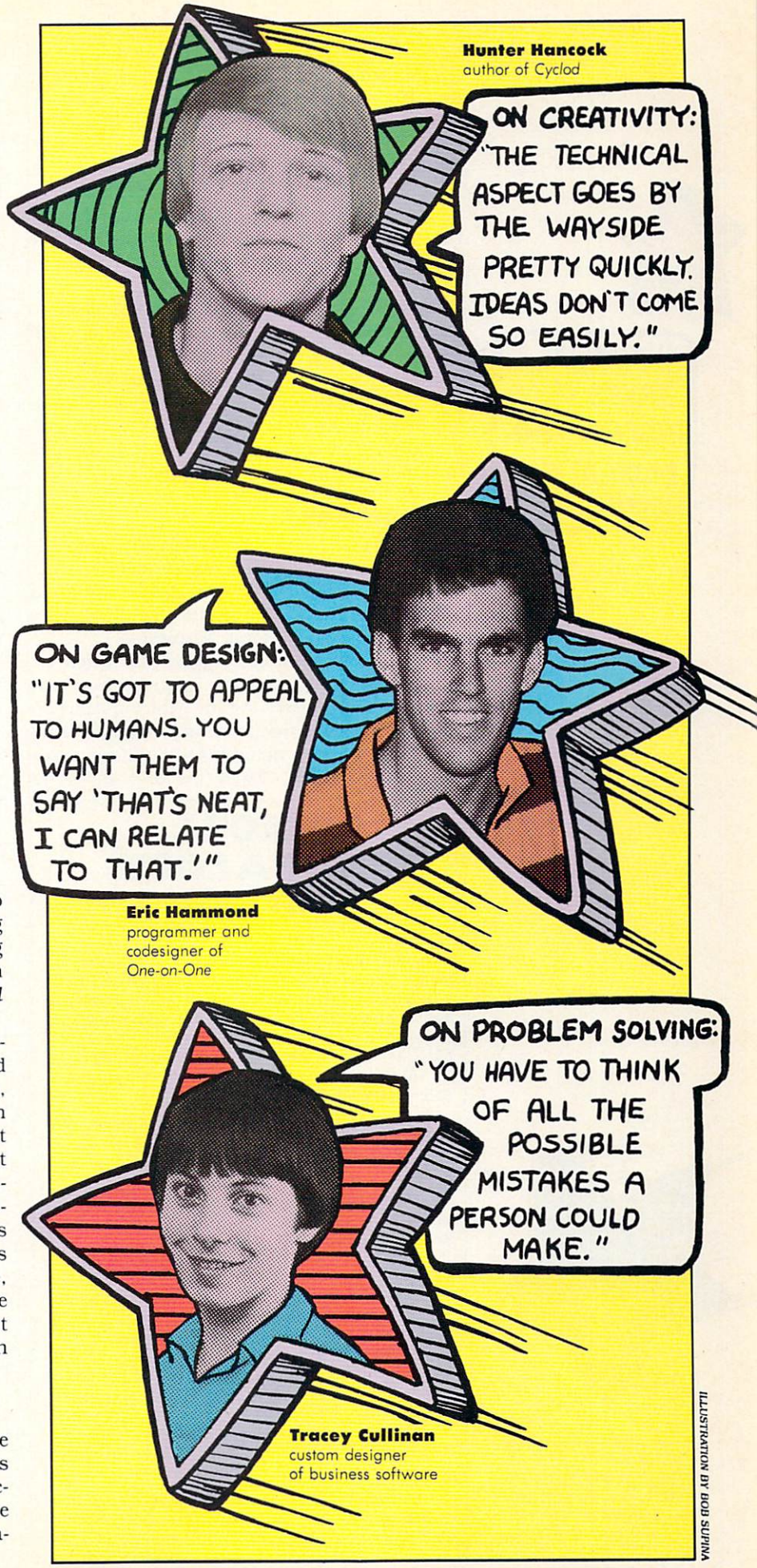


ILLUSTRATION BY BOB SUDYKA

"Living in Livermore, California, helped," says Stephen Landrum, who created *Communist Mutants from Space* for Starpath when he was 19. "Most peoples' parents worked at the [University of California's] Lawrence Livermore Lab, so we were introduced to computers early. Our schools got them earlier than anyplace else."

Many of the leading game software companies are located on the West Coast. So, for the aspiring software writer, California can be what the soda fountain at Schwab's was to yesterday's aspiring actress: the best place to be discovered. Stephen was fortunate enough to know Craig Nelson, one of Starpath's founders. "I went to school with his brother." Now 22, Stephen is a software designer/programmer for Epyx, where he worked on *Summer Games*, a sports simulation that shipped in time for the Summer Olympics.

TYPO ATTACK

While many young designers are from California, it's by no means a requirement for success. When Atari started one of its national searches for computer talent, the first prize winner was from St. Paul, Minnesota.

Dave Buehler was 16 years old when he wrote the winning program, *Typo Attack*. (Alan Alda has been advertising the game for Atari on television.) Now a freshman at Brigham Young University, Dave is using his $25,000 prize for tuition. He figures, "There are probably more people interested in computers out there in California, but companies are always looking for people [from] anywhere to write games, and to convert them from one format to another."

Dave is right about that. When Sirius Software got a look at Hunter Hancock's game, *Cyclod*, they flew him out to Sacramento from his home in Lexington, Kentucky. By taking special tests so he could graduate from high school without attending classes, Hunter was able to work for Sirius for the last three months of his senior year, and all summer, before starting college at MIT.

THINK LOGICALLY

Opportunity aside, just what kind of talent do these teenage programmers have that frequently earns them better wages than their high school teachers get? Sixteen-year-old Tracey Cullinan custom-designs business programs in Los Altos, California. He says, "You have to be good at problem-solving and thinking logically, but I wouldn't say you need to know more than high school algebra. I don't."

Eric Hammond, programmer and co-designer of Electronic Arts' basketball simulation game, *Julius Erving and Larry Bird Go One-on-One*, was voted Best Math Student at his high school in San Diego. But he considers math skills incidental to his success. "Anybody who wants to program can do it," he says. "At this level, most of the math involved is just adding and subtracting. What it takes is patience and dedication."

PLAIN OLD STICK-TO-ITIVENESS

Add a streak of motivation to patience and dedication and you've just about got the formula. Many of the young programmers taught themselves assembly language. (Assembly language is more complicated than BASIC, but it is also much faster to run, so it is the language of choice for most gamemakers. However, few high schools formally teach assembly language.) In fact, motivation is a common characteristic of these programmers. It goes beyond their computer work. Eric Hammond, besides being a college basketball player, plays about five different instruments, and is a sometime member of a jazz band. Michael Abbot scuba dives and is learning hang gliding. Hunter Hancock is studying to be a doctor.

Jeff Gold applied single-minded determination to understanding the business he wanted to enter. He started researching the software market when he was 15, talking to store owners, distributors, and designers. Now, at 17, he is the owner and chief executive officer of Double-Gold Software, suppliers of disk security systems designed to prevent software piracy. He earned the money to start Double-Gold by designing software for small businesses.

"I met people through computer stores and talked to some people at Apple," he says, "They saw I had the capability, so they came up with projects for me for private businesses.

WHO'LL TAKE A LOOK, WHO WON'T

K-POWER, a Scholastic computer magazine for young people, recently surveyed major software publishers on their willingness to accept freelance submissions. They found that the odds on selling a freelance program are long, but that it *is* possible. Call or write first, for submission guidelines.

Among the companies K-POWER surveyed, these accept freelance submissions:

Broderbund Software, 17 Paul Drive, San Rafael, CA 94903-2101. (415) 479-1170. Write: Kay Wayland, administrative assistant for product development.

Datamost, 2660 Nordhoff Place, Chatsworth, CA 91311. (213) 709-1202. Write: Gary Koffler, vice president of software.

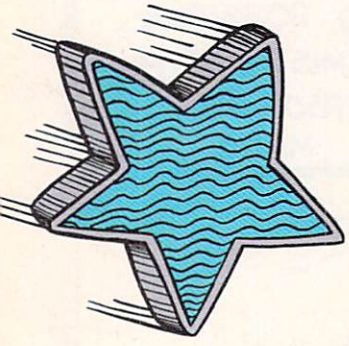
Epyx, 1043 Kiel Court, Sunnyvale, CA 94089. (408) 745-0700. Write: Dale Yocum.

Sirius Software, Inc., 10398 Rockingham Drive, Suite 12, Sacramento, CA 95827. (916) 366-1195. Write: Terry Bradley, president.

Strategic Simulations, 883 Stierlin Road, Building A-200, Mountain View, CA 94043. (415) 964-1353. Write: Chuck Krogel, manager of research and development.

Synapse Software, 5221 Central Ave., Richmond, CA 94804. (415) 527-7751. Write: Kelly Jones, vice president of programming.

K-POWER found that the following companies discourage or simply refuse freelance submissions: Infocom, Microsoft, and Sierra Inc.



MARC BERMAN *is a freelance writer from New York City who has just completed work on a book about the Apple IIe.*

"If I want to do something, I don't ask if I can do it. I assume I can. I read a few books on the subject and go ahead," says this self-made young man.

GREY FLANNEL SOFTWARE

Naturally when a kid designs business software it raises a few eyebrows. How can a 16-year-old know about inventory control and accounts receivable? Says Tracey Cullinan, "The main thing is to know the machine you're working on. Because clients usually have a pretty good idea of what they want." Tracey's programs aren't commercially available; he contracts with a company to design a specific type of program just for its own use, such as record-keeping or inventory control. For a national stock brokerage firm, for example, he wrote a program that helps calculate the constantly changing news from Wall Street into information for the firm's brokers.

Jeff's position as the head of a company puts him in the spotlight, where his youth may not inspire confidence. He explains, "Most of the business is over the phone, so people have no idea how old I am. When I go to trade shows and to meetings, I try to keep up an older-looking image. Most people think I'm 20 or 25."

Jeff was fortunate to have the support of his family, which he describes as "do-it-on-your-own people." He now studies business management at the University of California at Santa Barbara and hires contract programmers to develop new software for his company. "I don't consider computers my career," he says with assurance. "I like being an entrepreneur—taking an idea and building it up."

THE RIGHT IDEA, THE RIGHT MARKET

Like many of his colleagues, Jeff says that finding the right idea is a big part of a successful program. "A good idea can be an old concept made better," he says. "For instance, there are hundreds of word-processing programs out there, but most of them are poorly written." He also recommends finding an area of software development that isn't as crowded as games.

But even in a crowded category, a good idea shines through. Eric Hammond got to live out his fantasy of playing basketball with Philadelphia 76er all-star Julius Erving when he was working on *One-on-One*. Now he says that fantasy is the key to making a hit game. "You've got to get humans involved, so they're no longer playing a computer game, but living a fantasy." When he designs a new game, he tries to "make something human" out of pixels and bytes.

Many of these young programmers say that technical wizardry takes a back seat to creativity where hitmaking is concerned. Hunter likens himself to a novelist who knows how to type, but sometimes can't unblock his creative mind. "After a while the ideas didn't come easily. I spent a lot of time trying to force the issue." Dave Buehler called in an artist (his younger brother) to help him when he slammed against his own creative limits. The younger sibling helped design some of the shapes in *Typo Attack*.

"He's better than I am at drawing," says Dave. "Of course he wouldn't do it unless I gave him a percentage."

WHAT ABOUT GIRLS?

You may have noticed that all the teenage stars we've mentioned have been boys. Why? Will that change? We asked Eric Hammond. "When the video game first came out," he said, "there weren't that many girls playing. It was the guys who wanted to fly the fighter jets and destroy things. Most of the games were really aggressive." But when gamemakers began to design less violent programs, they began appealing to more women, says Eric. "There are a lot of women capable of creating games."

He cited Ann Westfall, coprogrammer of Electronic Arts' *Archon*, as an example. And the classic game *Centipede* was authored by a woman, Dona Bailey.

"I think there may be an explosion of female programmers," Hammond added. "And they may bring out different qualities in the games—making them less destructive and more constructive."

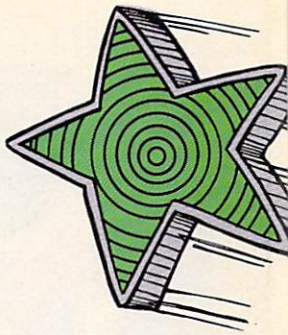
GETTING THERE FROM HERE

What can a young person living at home do to get into the commercial circuit? Tracey and Hunter started out by hanging around their local computer stores, running errands, and helping to demonstrate the computers to customers. Hunter submitted his first game to Sirius on a wing and a prayer. Same with Eric's first game, *Marauder*, which he sent to Sierra Inc. But before you go packing up your best efforts, Eric suggests, "Call or write to the company and tell them you have a great program. And have them send you a nondisclosure statement saying they won't copy it." Such agreements are common practice and protect both you and the software company if down the road there's a question about authorship.

Contests like the one hosted by Atari can help you make a name for yourself, as Dave did with *Typo Attack*. Check your local computer store and computer magazines such as FAMILY COMPUTING for announcements of competitions.

Michael and Jeff attend fairs like Applefest and trade shows like Softcon and Comdex. If you can get to them, trade shows are great places to exchange ideas and to meet designers and software company executives. If all else fails, you can do what Jeff Gold did, and start your own company. (But you'd better do some of the same hard work Jeff did, first.)

As for needing to be especially gifted, Eric says, "What I do is so normal it's not even funny. When they say we're whiz kids it's not really true. If you just work long enough you'll understand programming. When people talk 'wizards' I say 'Give me a break.' " FC



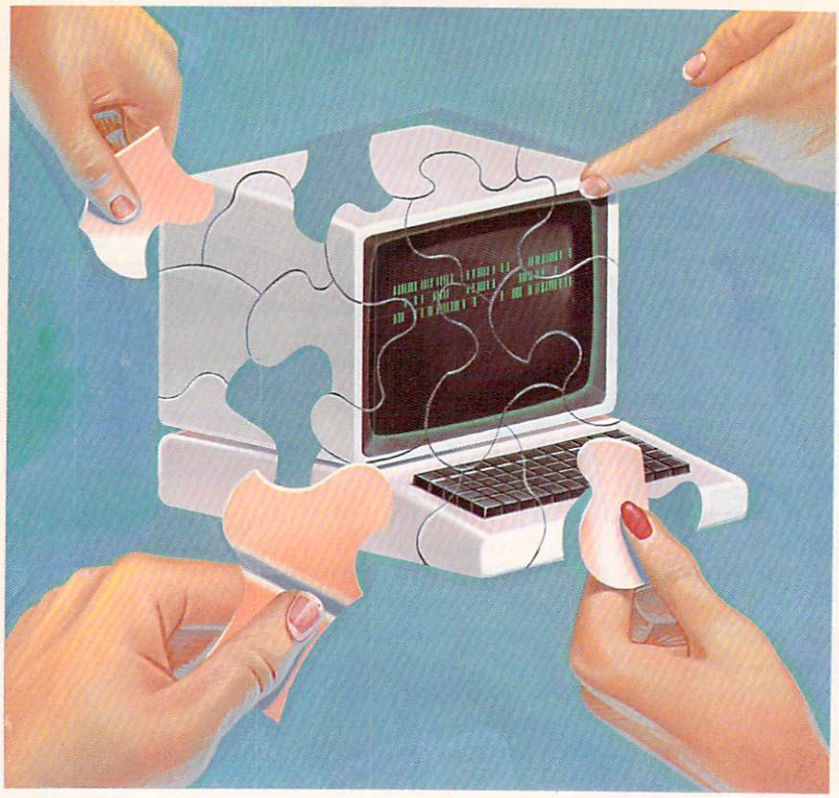


ILLUSTRATION BY PAUL BINKLEY

Life With a Computer: Solving the Puzzles

NO COMPUTER WILL BRING YOUR FAMILY TOGETHER ALL BY ITSELF—YOU HAVE TO HELP

BY GAIL HENDERSON

The road to happiness with a computer isn't always smooth. New computer-owning families sometimes become frustrated—not only with the machine, but with each other. Some even end up so disillusioned that their computers wind up in the closet. But it doesn't have to be that way. Some very simple steps can turn a computer from a hassle into the boon everybody wanted it to be.

Soon after Bob and Ann Jensen* bought a computer, their kids, Carolyn and her younger brother Danny, were not only squabbling over who got to use it first, but also over who was "smarter" at using it. After the kids went to bed and Bob finally had a chance to use the machine, he was too tired to concentrate. When, on a Saturday afternoon, Ann headed for the computer intending to work out a household budget, she found Bob already settled in.

"This computer has been real trouble," she complained to Bob one night. "We all know why we bought it. We were all going to learn how to run it together. We were going to computerize our family records. It was going to be fun. But so far it's been just awful. If we don't find better ways to live with the computer, I don't want one. So let's try."

MOVING TOWARD AN ACCOMMODATION

"You know, all this reminds me a little of when Carolyn came along," Bob said. "We thought we were ready, but we weren't. We hadn't really thought out where we were going to put all her stuff. We all had to change our ways of doing things. A computer's not a kid, but it seems to be making a few of the same demands, doesn't it?"

Ann thought about it for a minute. "I see what you mean. For one thing, we put the computer in a really lousy place. That corner of the family room is just too noisy. Danny came in to practice his trombone when I was trying to make some sense out of BASIC the other day."

"We've got to decide," Bob said. "If it's primarily a game machine, it's got to be in the family room near the TV. But then we can't use it when anyone's watching TV. And we'll keep tripping over the cords."

Ann frowned. "It's not primarily for games. I vote we move it somewhere quiet, and spring for a green-screen monitor. We can bring the computer back into the family room any time we want."

The Jensens and the Wymans are fictional composites, based on interviews with families and family researchers.

They moved the computer work area to an alcove not far from the kitchen. It wasn't elaborate, but it was quite practical. Bob built a small, simple worktable. He measured it so that the top of the monitor would be just about at eye level—ideal for working comfortably.

The Jensens keep their family's financial and medical records in a couple of kitchen drawers. Since the computer is now nearby, it's become easier for them to computerize their home-management tasks. Just around the corner from their new workstation they have a bookcase, where the encyclopedia and dictionaries are kept. Now, the kids can do their homework using the computer, without having to haul reference books halfway across the house.

To complete their workstation, the Jensens bought an "arm lamp" which clamps onto the side of their worktable. It can be moved to focus on papers near the computer without adding unwanted screen glare.

LEARNING TO RELAX

Ann was looking at the local junior college's continuing-education catalog one night when she noticed an introductory computer class listed. "Bob, it says here they've got a course on how to run your new computer and it also covers what you can do with it. Although we already know some of this, I feel like I still can use some help. The kids get computer classes at school, but what about us?"

Bob looked at the listing. "From the sound of it, I think there'll be a roomful of people like us. How about if we try it?"

As they sat in on the classes, the Jensens learned an important and unexpected lesson. They learned to relax around their computer. "We were uptight and worried about doing everything 'right,' " Bob said later. "Eventually, we began to tinker, dabble, and just play with the computer. We found that we learned the most when we weren't worrying about making mistakes. We really began to enjoy it."

At their classes, the Jensens also found out about some new ways to use their computer. For example, Ann Jensen had always wanted to learn some music theory; she discovered there was some very sophisticated music software available for her computer.

GETTING TIME ON THEIR SIDE

The Jensens' busy schedules made dividing up computer time a very sore issue. They learned a good solution from their longtime friends, the Wymans, who had bought a computer nearly a year earlier. The Wymans had printed out a schedule and each family member got to choose blocks of time. Their system was flexible: Family members could trade time, or borrow against the following week's allocation. But once everyone made their decisions for the week, they had to abide by them. Using the Wymans' technique, the Jensens started having fewer scheduling conflicts.

But Bob and Ann had hoped the computer would bring them all together, and that still wasn't happening. What could be done?

'FAMILY COMPUTER NIGHT'

"Most of what we do on the computer, we do alone," Ann observed at dinner one evening. "Let's try a 'family computer night.' We'll only work on things we can do together."

Danny was skeptical since he was protective of both his programming projects and his privacy. "That won't be any fun," he said.

"We'll see," said his mother. She borrowed an adventure game the family could play together. Bob brought home a light take-out dinner. For that evening, the computer came back into the family room.

Each family member talked about the problems they were having with the computer, turning to the others for suggestions on solving them.

"I don't like always having to go back to the manuals," Carolyn said. "They're always in my way, except when I need to find something, and then I can't."

"How about if you make a list of all the things you use the most often?" Danny suggested. "Like if you always use the same bunch of commands, you can just get them by looking at the list. We can tape it to the wall."

"We're not going to tape it to the wall," Bob said. "I'll put up a bulletin board."

The Jensens also decided on a family project. They would learn Logo together. (*For more information on Logo, see* FAMILY COMPUTING*'s new six-part series, "Learning Logo," which begins this month.*)

At the end of the evening, his mother asked Danny whether, just maybe, he'd had fun. "Well . . . a little," he admitted shyly.

Later, Bob told Ann he thought the family could go even further. "Were you watching Carolyn?" he asked his wife. "Every time Danny showed off, did you see her wince? It's great he's learning all that stuff, but how can we convince him to share it?"

Bob came up with another chart to hang beside the family schedule on the new bulletin board. It recorded new skills and completed projects, and it gave extra points for teaching the skill to others. Bob and Ann also made a point of learning from their children and thanking them for being willing to teach. Danny was thrilled at the chance of teaching his father. It was a useful reminder that learning is a lifelong process.

The Jensens learned a lot from all this—not only about computers, but about themselves. "We seem to have expected the new computer to bring us together without much effort on our part," Ann says. "But nothing automatically brings a family together. You have to make it happen. You have to come up with ways to channel everyone's energy away from conflict, and into sharing and being productive." FC

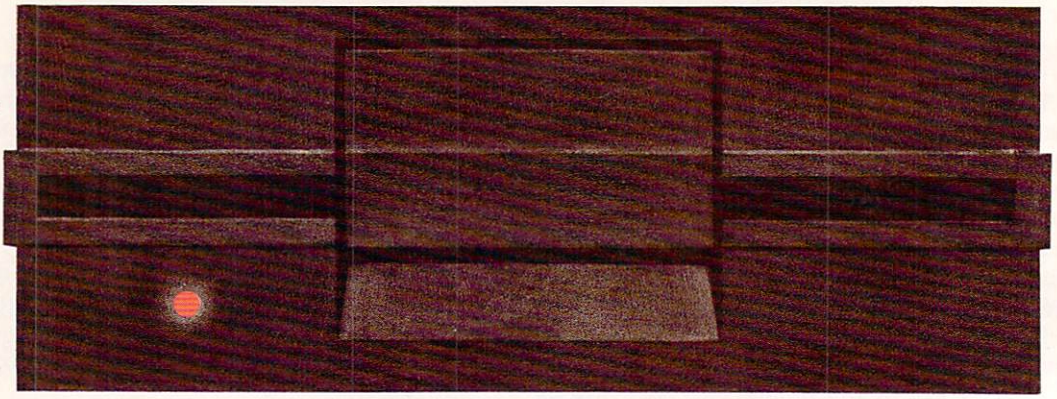
EIGHT STEPS TO HAPPY COMPUTING:

1. Put your computer in a sensible place.
2. Create a comfortable workspace.
3. Take a course.
4. Post a schedule for each family member's computer use.
5. Hold a 'family computer night.'
6. Choose a family-learning project.
7. Ask everyone in the family to teach each other.
8. Relax. You won't break your computer.

Freelance writer GAIL HENDERSON *of Worthington, Ohio, has taught the art of parenting and family communication, and is the author of* Dimensions of Life: A Book About Self, Family and Work, *a high school textbook. She's also led workshops on computing in the classroom.*

BUYER'S GUIDE TO DISK DRIVES

YOU WANT A DISK DRIVE. BUT WHICH ONE DO YOU WANT?



You've decided to add a disk drive to your system. You want the convenience and speed that a drive offers, and you want access to the large amount of software written in disk format. But which drive do you buy?

For most people, "disk drive" means a 5¼-inch floppy disk drive—that's the standard for microcomputers. Don't be confused by other types of drives. Unless you have unusual needs, you won't need all the storage capacity a hard disk drive offers (nor will you want to spend the money). And there's not much software written in the 3½-inch format, so that type of disk drive won't do you much good unless you're a star programmer.

When it comes to choosing, you can buy the computer manufacturer's own drive—an Apple drive for an Apple computer, say—or a drive from an independent "third-party" manufacturer. Often these third-party drives—made by companies such as Concorde, Indus, Micro Systems Development, Percom, and Rana—are less expensive and faster, and can store more data than the computer manufacturer's drives. But, as with most buying decisions, there are pros and cons on each side. Third-party drives might not, for instance, run all the software written for a particular computer. In the end, your decision will have to be based on which factors are most important to you.

POINTS TO CONSIDER

1. Service. Disk drives, being mechanical devices with lots of small, moving parts, have been known to break down. Thus, availability and cost of service are prime buying considerations. In this regard, manufacturers with more dealers and certified repair centers have a decided edge. It's easier to take the drive back to the store you bought it from, or another like it, than to send it back to the company. In general, computer manufacturers will have more outlets than third-party manufacturers, though they often charge you a hefty price for the service. On the other hand, some third-party manufacturers, such as Indus and Concorde, offer one-year warrantees, and will replace any defective drive at no charge. So, before you buy, check about the servicing arrangement.

2. Software compatibility. A disk drive sold by a computer manufacturer can be expected to run all software written for that computer. You can't be so sure with a third-party drive. Unless otherwise noted in the following reviews, the drives we tested ran all the software we tried—but we didn't try it all. In most cases, third-party manufacturers indicate the percentage of software their drives will run. Be sure to check with the dealer or manufacturer for compatibility before you buy.

3. Storage capacity. The storage capacity of a disk drive—or the amount of data that can be saved on one disk—is measured in bytes (as is Random Access Memory). The range is from about 130K (about 90 double-spaced typewritten pages) to more than 600K (about 350 pages), depending on the type of drive. Floppy disk drives can store data on one or both sides of a disk, making them single-sided or double-sided, and they can store data in single-density or double-density formats (double-density disks store twice as much data as single-density ones). Single-sided, single-density disk drives store the least data, and double-sided, double-density drives store the most. But there are combinations in between, such as single-sided, double-density, etc. The manual will tell you what kind of disks to use.

4. Speed. Disk drives are a lot faster than cassettes, but they can still seem slow sometimes. If you need to do a lot of "disk work," such as making backups or initializing new disks, speed is important. We have not noted speed in these reviews unless a drive is unusually slow or fast. In general, third-party disk drives are faster than the computer manufacturer's drives; at worst, they operate at the same speed.

5. What's needed. Unlike cassette recorders, which require constant monitoring and manual adjustment, disk drives work primarily under computer control. This requires complex communication between the disk drive and the host computer, and depends on both the hardware and the software—a circuit called a disk drive controller and a program called a Disk Operating System, or DOS.

Once you have the controller and the DOS, which usually comes with the first disk drive but is sometimes sold separately, you can add a second drive without any additional equipment. Thus, adding a second drive is almost always cheaper than the first drive.

In most cases, you can "mix and match" drives off the same controller—coupling a computer manufacturer's drive with a third-party model. Some controllers allow you to run more than two drives at once, though this has little practical value. Adding drives allows you to store more data, but this method is not as efficient as adding a hard disk drive.

Here's a rundown of the floppy disk drives available for Apple, Atari, Commodore, IBM, and Radio Shack microcomputers. There are more disk drives available for these computers than for other brands, such as Texas Instrument and Timex.

APPLE

Apple. Apple sells disk drives in several forms. The Apple Disk II ($429), a single drive, has been around a

ILLUSTRATION BY NICK JAINSCHIGG

long time and is a proven performer. It stores 143K. When it breaks down, as drives will, Apple offers quick service at one of its many dealers. Apple, in fact, is probably the best when it comes to disk-drive service.

The Apple Duodisk ($729), a half-height dual drive, is similar to the Disk II, except for its sleek, stylized look. Beware: With any dual disk drive, if one drive breaks down, and you have to send out for repairs, you're out of disk drives.

Finally, Apple makes a second drive for the Apple IIc. (The IIc comes with a built-in drive.) This second drive is external, sleek, and low, in keeping with the rest of the IIc design. All Apple II drives store 143K (Macintosh drives store 400K). They are somewhat nondescript—but their redeeming quality is dependability.

Concorde. Concorde Peripheral Systems makes two drives for the Apple. Both come with a full one-year warranty. The Concorde C-III single drive ($249) stores 163K, is completely software compatible with the Apple II plus and IIe, and looks very much like an Apple drive. However, it's a little noisier than an Apple drive and requires the Concorde C-130 controller card ($89) to run the Apple ProDOS operating system, and thus assure full Apple compatibility.

The Concorde C-1214 dual disk drive is an alternative to Apple's Duodisk and has the same "half-height" configuration. Together, the two Concorde drives store 326K. This dual disk drive system comes with the C-130 controller card, which allows you to use up to four disk drives from a single slot in the Apple II.

Indus. The Indus GT disk drive ($355) is software compatible with the Apple II series and stores the same 143K. However, the Indus drive is sleeker and somewhat more attractive than an Apple drive, and significantly quieter. In addition, it comes with three pieces of free software—word-processing, spreadsheet, and data-base programs. These are not the best programs available, but they work. The Indus is the fastest drive for the Apple.

PROS AND CONS OF THIRD-PARTY DISK DRIVES

PROS	CONS
Often faster	May not run all software
Often store more data	written for a particular
Often have extra features	computer
Often less expensive	May be harder to service
Often more reliable	

ADDRESSES OF THIRD-PARTY DISK DRIVE MANUFACTURERS

Concorde Peripheral Systems Inc.
23152 Verdugo Drive
Laguna Hills, CA 92653
(714) 859-2850

Indus Systems
9304 Deering Ave.
Chatsworth, CA 91311
(800) 334-6387

Microsci Corp.
2158 S. Hathaway St.
Santa Ana, CA 92705
(714) 241-5600

MSD Systems
10031 Monroe Drive
Suite 206
Dallas, TX 75229
(800) 527-5285

Percom Data Corporation
11220 Pagemill Road
Dallas, TX 75243
(800) 527-1222

Rana Systems
21300 Superior St.
Chatsworth, CA 91311
(818) 709-5484

Trak Microcomputer Corp.
1511 Ogden Ave.
Downers Grove, IL 60515
(800) 323-4853

Microsci. Microsci sells three disk drives for the Apple II line, all fully Apple-compatible. The A20 ($199) stores 164K. The A80 ($469) stores 328K, and comes with several utility programs. The A2 ($345), a direct replacement for the Apple Disk II, stores 143K and connects to the Apple or Microsci controller.

Rana. Rana Systems has three different drives for the Apple II line (except for the IIc), all of which offer more storage capacity than Apple drives. The most economical, the Elite One ($349), stores 163K of data; the Elite Two ($549) stores 326K; and the Elite Three ($649), an astounding 652K. That's a lot of storage on one disk—probably a lot more than most people need.

But Rana's most unusual product is the 8086/2. This is a dual disk drive that runs both Apple and MS-DOS software, effectively turning the Apple II into two computers. The drive, with its own microprocesor, is in fact a computer itself. The 8086/2 ($1,895) also comes with 256K RAM, expandable to 512K, which is enough to run some high-powered business programs. However, much IBM software must be slightly modified before it will run on the 8086/2.

ATARI

Atari 1050. The Atari 1050 ($449), a new drive to replace the old Atari 810, stores 128K—a considerable improvement over the 810's 88K storage capacity. The 1050 can be used with either Atari DOS 2.0 or DOS 3.0. The latter comes bundled with the drive. Unfortunately, the 1050 drive is no more reliable than the old Atari drive, and many users look elsewhere.

Concorde. Concorde's C-221M disk drive is designed for Atari users who want extra storage capability at a good price. The C-221M master drive ($369) allows for 176K storage, significantly more than the Atari 1050's 128K. In addition, up to three "slave" drives may be connected to the master drive. These slave drives, at $269, are priced considerably lower than the Concorde master drive, or other Atari-compatible drives.

Indus. The Indus GT drive for the Atari ($485) stores up to 188K, and will run programs written for Atari's 88K 810 drive. Indus uses the same attractive design for this Atari drive as for its Apple drive, and again offers three free software packages—word-processing, spreadsheet, and data-base programs. The GT drive has LED displays on the front that tell you what track of the disk you are accessing, and a "write-protect" button, which prevents you from erasing data on the disk. The GT is very quiet.

Percom. Percom's AT88S1PD drive can store up to 176K. It costs $419, and comes equipped with a parallel printer port. If you have a printer in mind that will use this port, then the higher price may be worth it.

Rana. The Rana 1000 ($449) can also read disks written for the Atari 810 and 1050 drives. It can store up to 180K. Like the Indus GT, the Rana 1000 has an LED control panel on the front, which includes the "write-protect" feature.

Trak. Trak Microcomputer Corp. has three floppy disk drives that are compatible with all Atari computers and all software that runs on Atari computers. The AT-D4 ($649) is a double-sided, double-density drive, with storage capacity of 352K. This drive sports the same features as the Trak AT-D2 ($499), such as a built-in parallel printer port, and various light indicators on the front panel. Another drive, the AT-S2, is designed to be used in conjunction with the AT-D4 for those who need mass storage capability. The two drives together can store over 700K.

COMMODORE

Commodore 1541. The Commodore 1541, while one of the least expensive drives around (approximately $279), and one that offers plenty of storage (174K), also has a

reputation for frequent breakdowns. Commodore will replace a defective drive, but you must pay $85 if the 90-day warranty has expired. And you must wait at least three weeks for shipping to Commodore and back. Beyond this, the 1541 is painfully slow—in some cases four times slower when loading programs than other drives.

Concorde. The new Concorde C-321P disk drive plugs into the expansion port on the Commodore 64, unlike the 1541, which plugs into the serial port and transfers data more slowly. The high-speed data transfer is especially helpful when using word-processing and spreadsheet programs—or any time you need to access a disk frequently.

MSD Systems. The Super Disk Drives from MSD offer some attractive features, though they are considerably more expensive than Commodore's 1541. The SD1 ($399) is a single drive that stores 174K and the SD2 ($699) is a dual drive, with each drive storing 350K. Both the SD1 and SD2 connect to the standard serial port on the Commodore 64 or VIC-20, and run most—about 95 percent—of the Commodore software.

The main advantage of these drives is that they can also connect to the Commodore expansion port with an IEEE parallel interface, allowing much faster transfer of data. For example, while a Commodore 1541 drive takes about 90 seconds to format a disk, the Super Disk Drive can do it in 17 seconds. However, the IEEE interface is not included in the purchase price, and using it reduces software compatibility considerably. More than half of the programs for the Commodore won't run with the IEEE interface, making it more a tool for programmers than for those who want to buy commercial software. Both MSD and Batteries Included, a hardware/software company from Toronto, Canada, sell IEEE interfaces for the Commodore 64 and VIC-20.

IBM

IBM. IBM sells two kinds of disk drives. For the IBM PC, it offers internal drives that store 180K ($289) or 360K ($425); for the PC*jr*, only the 360K drive ($480) is available. These drives are built into the computers and are not external. After the 90-day warranty expires, servicing depends on the type of agreement you've made with your dealer.

Rana. The Rana 2000 drive ($399) is also a double-sided drive that stores 360K, and it's made to mount inside the IBM PC housing. It's much quieter than the IBM drive, and runs both MS-DOS 1.1 and MS-DOS 2.0. The Rana 2.5 is an external disk drive that stores an incredible 2.5 megabytes on a single disk—that's 2500K. The drive comes with five disks; additional disks cost $79 for a box of five. The Rana 2.5 ($1,550) runs PC-DOS 2.0.

RADIO SHACK

Radio Shack/Tandy Corp. Radio Shack's TRS-80 Model 4 is sold in three versions: a 16K model, without disk drives ($799); a 64K model with one disk drive ($1,099); and a 64K version with two disk drives and an RS-232C serial interface ($1,299). The disk drives are installed at a Radio Shack service center. They are built into the Model 4 housing, and store 184K of data. A third disk drive (external) costs $319; a fourth costs $279.

Color Computer owners can also add one or two disk drives. The first costs $399, and the second, $279. These drives, which store 156K, require Extended BASIC. Complaints about Radio Shack drives are virtually nonexistent, a testament to their reliability.

Third-party manufacturers. As with the IBM PC, which uses internal disk drives, it's possible to buy disk drives for the TRS-80 Model 4 through mail-order houses. Disk drives from companies with established reputations, such as Tandon, Siemens, Teac, and Shugart, are available, often at prices well below Radio Shack's. The problem is that you must assemble them—put a "bare" drive into its casing, then put the casing inside the computer. If you're up for this kind of work, then you can save some money.

Here's a list of mail-order houses that offer disk drives for Radio Shack computers:

Texas Computer Systems, P.O. Box 1327, Arlington, TX 76004; (800) 433-5184; Software Support Inc., One Edgell Road, Framingham, MA 01701; (617) 872-9090; Micro Data Supplies, 22295 Euclid Ave., Euclid, OH 44117; (800) 321-3552; in Ohio, (216) 481-4993; Displayed Video, 886 Ecorse Road, Ypsilanti, MI 48197; (313) 426-5086.

TI and TIMEX

Disk drives for the TI-99/4A are not exactly easy to come by, now that the computer is no longer manufactured. But Triton Products Co., which has taken over the marketing of TI products, offers a Mini Peripheral Expansion System from Myarc, Inc., in its catalog. This $595 system, which connects directly to the TI-99/4A, includes a disk drive, 32K RAM expansion, and serial and parallel ports. Up to four disk drives may be attached to the system. For information, contact Triton Products Co., P.O. Box 8123, San Francisco, CA 94128; (800) 227-6900.

For the Timex 1000, 1500, and 2068 computers, the disk-drive vendor recommended most often is Aerco, P.O. Box 18093, Austin, TX 78760; (512) 451-5874. Its drives, with interfaces, cost approximately $500.

—LOUIS WALLACE

DIARY OF AN EX-CASSETTE USER

To disk, or not to disk? This question, I'm sure, is foremost in the minds of practically all tape users each time a long taped program is being loaded. And the question looms even larger each time a NO-LOAD occurs. I use a data-base management system in my business, and as my customer file has grown, the LOAD and SAVE times have been increased accordingly.

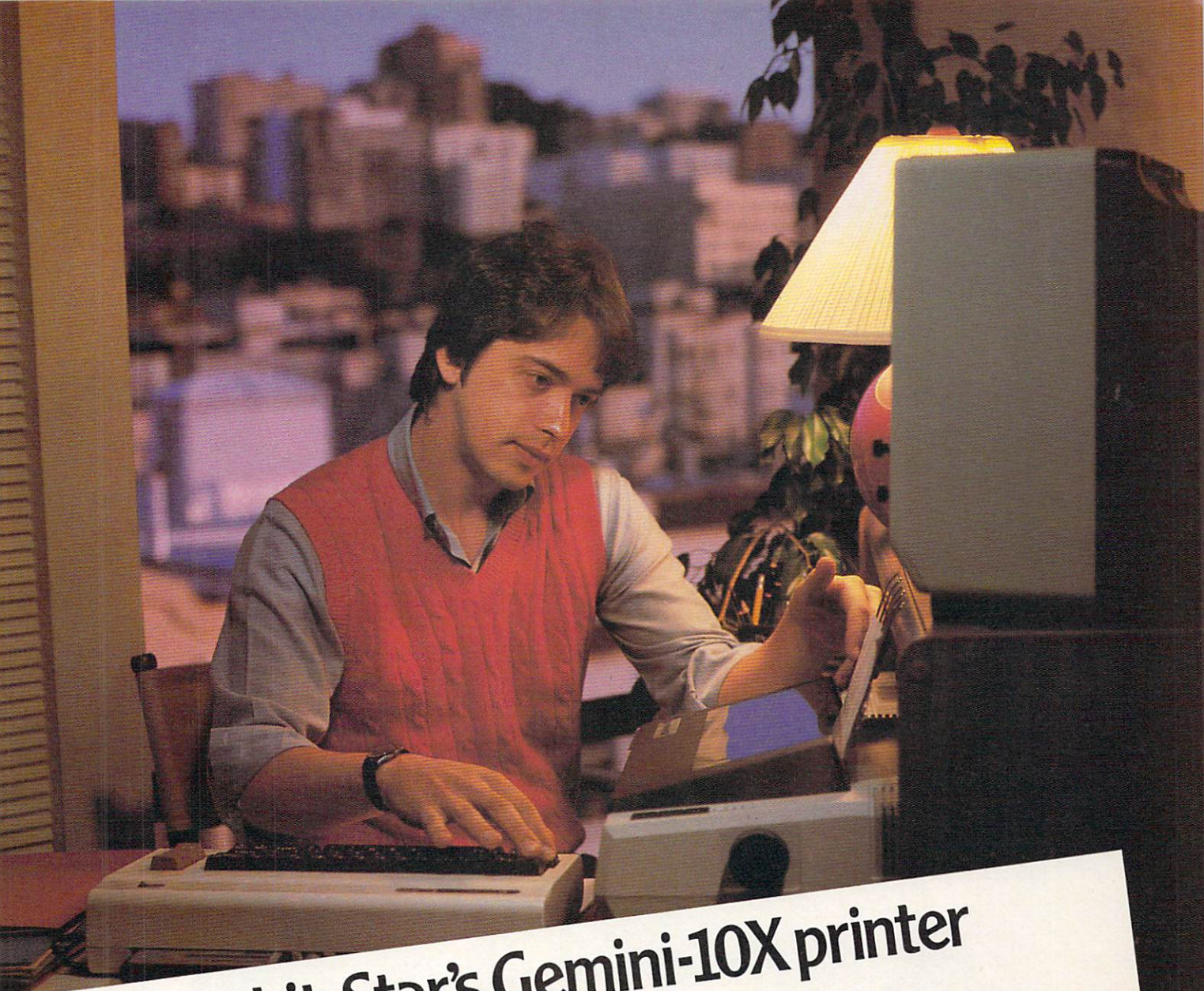
But, I'm rather conservative, and can rationalize very easily. "I'm up to a 25-minute LOAD, so what?" I just get to the office a few minutes early, start the old tape machine running, and go ahead with my early morning activities. No problem at all—unless there's a problem with the LOAD. Sound familiar? Even this I can live with. So it takes an hour to get on-line. I'm in no hurry anyway. Or am I?

The phone rings and now I need some information from the system and I'm still looking at black-and-white squiggly lines on the screen. I tell myself that this isn't such a big deal. I tell the customer that the computer doesn't come on-line until 9 a.m. and that I'll return the call in just a few minutes. This sounds impressive and is a good stall. All the while, I'm hoping that the second LOAD attempt will be successful. I'm also thinking about the speed with which a disk drive could provide the information.

That was the old days. To make a long story short, I ended up getting a disk drive. I am not capable of describing the pleasure and pride of owning and operating the system I now have. The 25-minute LOAD time for my data-base management system was reduced to about 20 seconds. A box of taped programs now lies in the corner of my office, banished to obscurity as each tape has been loaded into the computer in "X" minutes and SAVED to disk in "X" seconds. The utility of my system grows each day as I incorporate programs not previously used. I've entered a whole new world.

By the way, I own a Timex Sinclair 1000, with 48K RAM. I bought a disk drive and FDZX interface from Aerco Manufacturing.

—JACK ROBERTS



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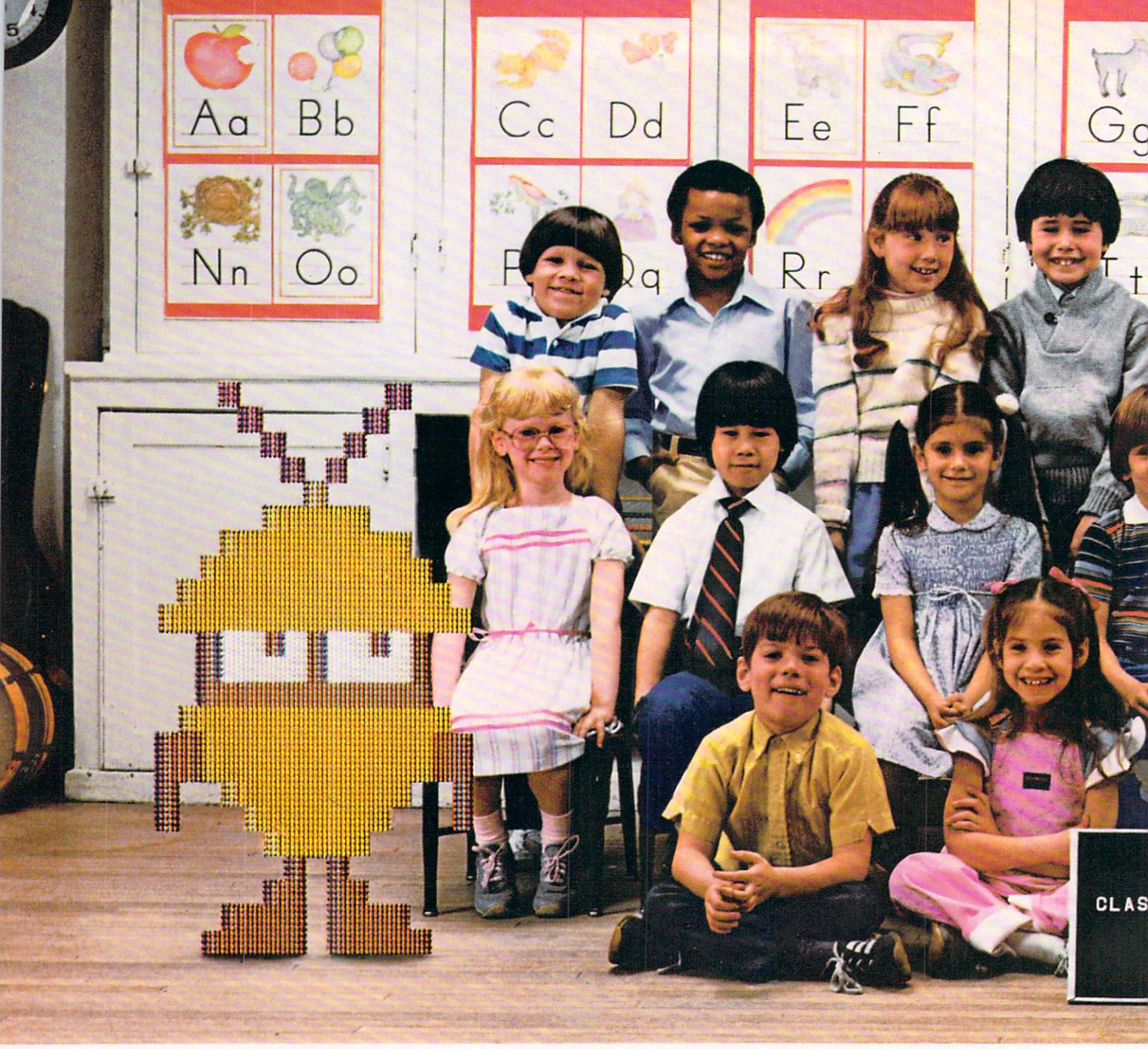

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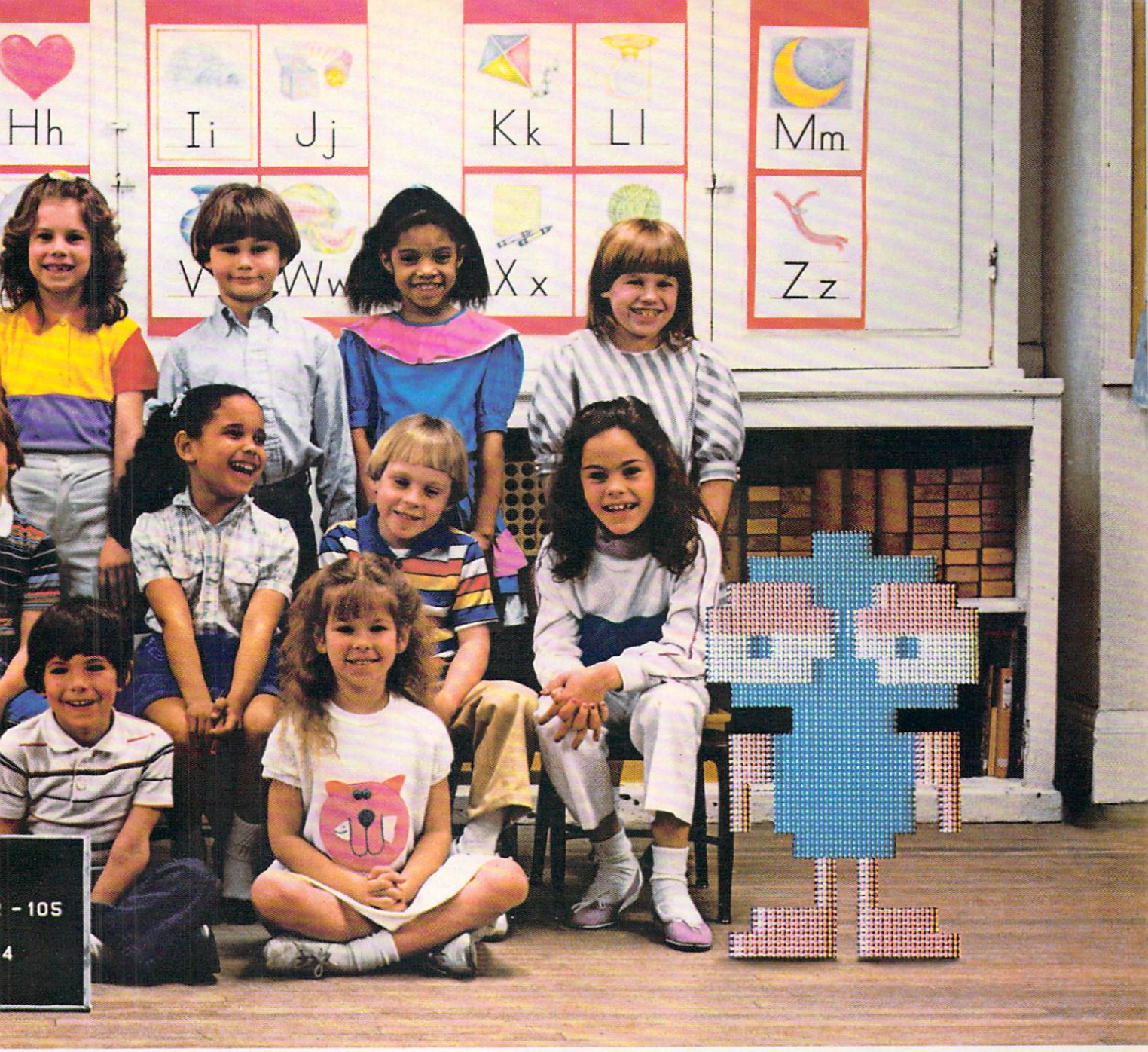

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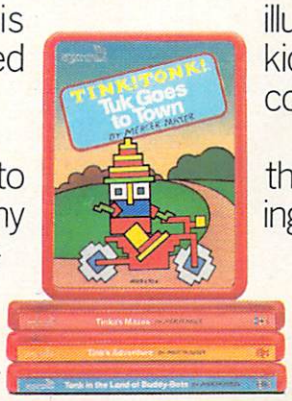

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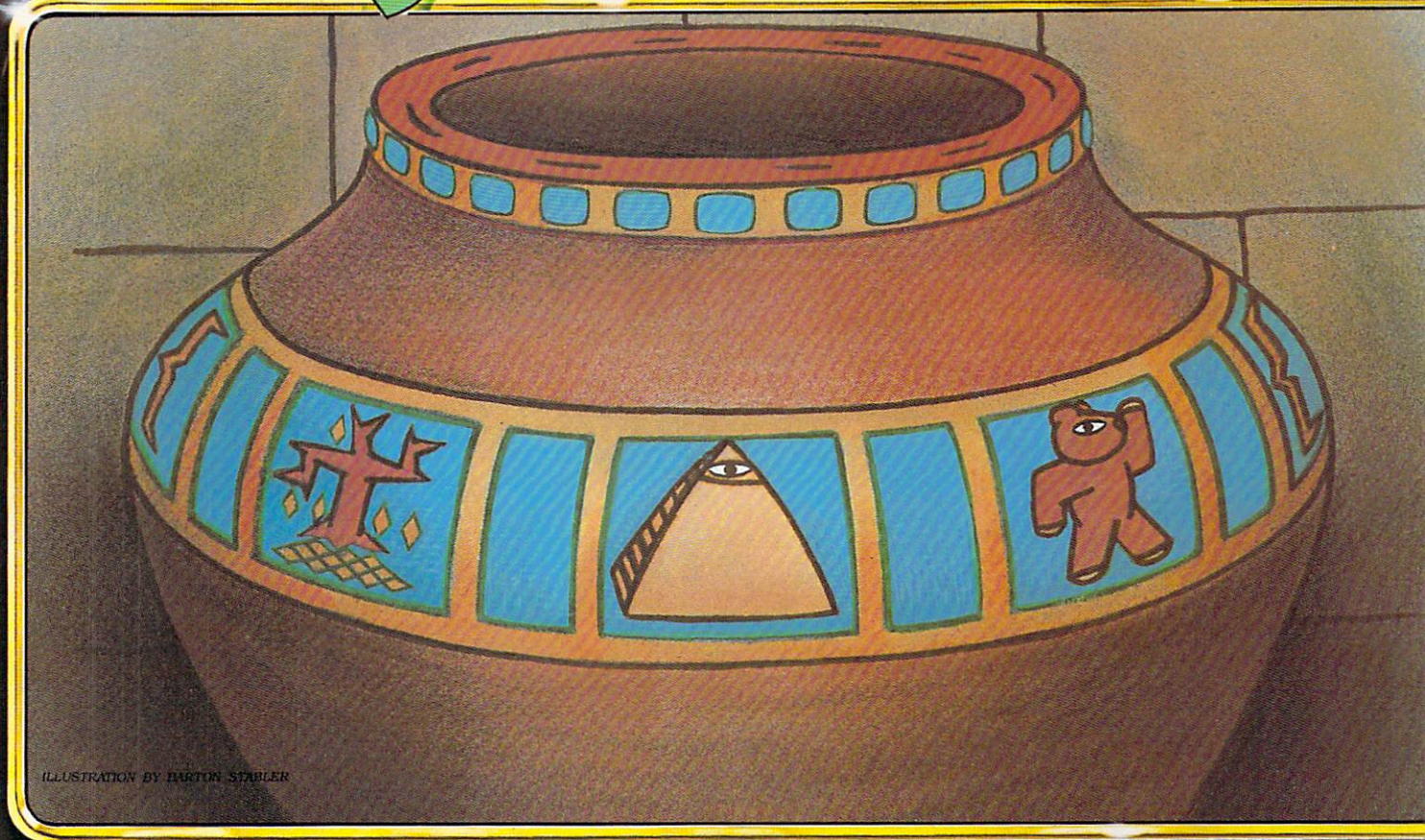


ILLUSTRATION BY BARTON STABLER

★ S E P T E M B E R ★

BYTE-SIZE BASIC
Page 76

A new feature.
This month:
How to type in
programs.

BEGINNER PROGRAMS
Page 84

Turn that
tricky telephone number
into a word
you won't ever forget,
and enjoy the pleasure
of the changing seasons—
without doing any work!

READER-WRITTEN PROGRAM
Page 108

Put your Commodore 64
to work
singing bedtime lullabies.

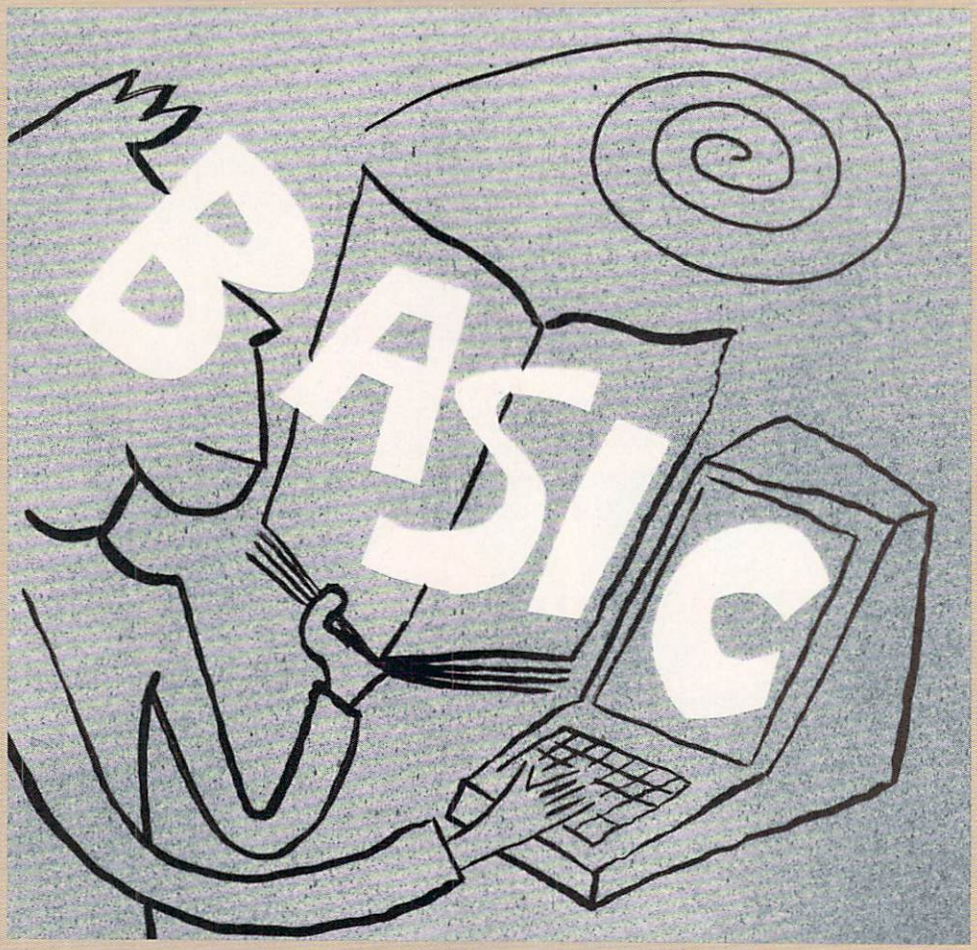
PROGRAMMING P.S. Page 104 Sorry, we goofed! Corrections and enhancements to previous programs.

ILLUSTRATION BY JIM CHERRY III

HOW TO TYPE IN PROGRAMS

START BY TYPING IN PUBLISHED PROGRAMS. YOU'LL SOON BE ON THE WAY TO CREATING YOUR OWN.

BY JOHN JAINSCHIGG



Learning to program doesn't have to be a chore—if you go about it with imagination, it can be downright entertaining. This month we explain what you need to know to type a program into your computer and get it to work. In future months, "Byte-Size BASIC" will teach you programming the easy way: with short, fun programs to type in and enjoy—and learn from!

BASIC is a very simple and straightforward programming language. It's easy to learn because its small vocabulary consists mostly of Englishlike expressions. It's well suited to beginning programmers because it works in an interactive way that makes it easy to experiment with and to correct mistakes.

Still, a complicated-looking BASIC program can look intimidating—although typing it into your computer and making it work can be easy and enjoyable. By understanding a little about how BASIC works and knowing the ground rules for correcting typing errors, you'll avoid the pitfalls beginners fear most. Here's a step-by-step guide:

JOHN JAINSCHIGG *is* FAMILY COMPUTING*'s technical editor.*

1. Find a program that will run on your computer. Not all BASICs are the same. The BASIC language that comes with your microcomputer is designed to work only with that brand of system and is different from others. Don't jump in head first! Unless you understand the differences between various versions of BASIC, be sure to choose only programs written to run on your machine.

Many micros come with beginners' versions of BASIC built in, although they sometimes also have other dialects available for more advanced programming. (*See Chart No. 1.*) If you don't have TI Extended BASIC, for example, you'll only be able to run programs written in the version that comes built into all TIs.

Finally, make sure you have any additional equipment that's required for a particular program: extra memory, joysticks, disk drive, printer, etc. Read the introductory notes and headline above the program carefully for this information. If there's no mention of what language or peripherals are required, chances are that the program will run on any computer of that brand.

2. Get the machine ready. The next step is to

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make sure BASIC is ready to go. Check that everything is connected correctly (and plugged in!). Then turn on your TV or monitor, your other peripherals, and finally, your computer. Check Chart No. 1 for details on how to start up the version of BASIC you want, or have, on your machine. You should see an introductory message on the screen and a "prompt" (the word READY or OK, or some special symbol like › or], that tells you the computer is waiting for you to type something in).

3. Make yourself comfortable. Now you're in BASIC, but you're not quite ready to start typing yet. Before you begin typing in a long program, it's wise to spend a few moments getting comfortable in front of the keyboard. Make sure that your chair provides proper support for good typing posture. Check that your TV or monitor is tuned for maximum clarity, and place it at a comfortable viewing angle and where it is free of glare. Take a look at the printed page you intend to type from. Is there enough light to read the program listing easily? Do you want to prop the page against something or let it lie flat? Remember, a little time spent getting comfortable can save you backaches and eyestrain later on! (*For more information on ergonomics, see "How People and Machines Can Work in Harmony," in the November and December 1983 issues of* FAMILY COMPUTING.)

4. Explore the keyboard. Your computer keyboard is set up to resemble a typewriter's, but there are several differences, many of which are specific to one brand of computer or another.

Part of the computer keyboard's function is typewriter-like: When you press a key, the corresponding letter, number, punctuation mark, or special symbol appears on the screen. Most computers also have keys for special functions: to produce graphics characters, to invert characters (switching to light-on-dark or dark-on-light), to clear the screen, etc. Computer keyboards manage to be very versatile by adding extra keys and by giving additional functions to normal keys.

CHART 1 HOW TO GET YOUR COMPUTER INTO BASIC

COMPUTER	VERSION OF BASIC	FORM	HOW TO ACTIVATE
ADAM	SmartBASIC	Loaded from digital data pack	Turn on system; insert SmartBASIC digital data pack in left drive; press button marked RESET COMPUTER. BASIC will load automatically.
Apple II series	Applesoft BASIC*	Built in (ROM)	Cassette systems: Turn on computer. Disk systems: Place DOS-formatted disk bearing HELLO file in Drive 1. Turn on computer.
Atari Home Computers	Atari BASIC	400 & 800 cartridge; 600XL, 800XL built in (ROM)	400 & 800, prepare by inserting BASIC cartridge in center or left-hand cartridge slot, respectively. Then, for all models, proceed as follows: Cassette systems: turn on computer. Disk systems: turn on disk drive(s). Place Master or other disk with DOS in Drive 1. Turn on computer.
Commodore 64	C 64 BASIC	Built in (ROM)	Turn on computer.
IBM PC	Cassette BASIC	Built in (ROM)	Turn on computer.
	Disk BASIC	Loaded from disk	Place DOS disk in Drive A; turn on computer; wait until self-check completed; at A> prompt, type BASIC, and press RETURN.
	Advanced BASIC	Loaded from disk	As above, but enter BASICA at A> prompt.
IBM PC*jr*	Cassette BASIC	Built in (ROM)	Turn on computer.
	Cartridge BASIC	Cartridge	Cassette systems: Place cartridge in either cartridge port; turn on computer. Disk systems: Place cartridge in either cartridge port; place DOS disk in drive; continue as above for IBM PC Disk BASIC.
Texas Instruments 99/4A	TI BASIC	Built in (ROM)	Turn on computer; press any key for menu; select TI BASIC at prompt.
	TI Extended BASIC	Cartridge	As above, but select TI EXTENDED BASIC at prompt.
Timex Sinclair 1000 & 1500	Sinclair BASIC	Built in (ROM)	Turn on computer.
TRS-80 Color Computer	Color BASIC	Built in (ROM) in entry-level machine	Turn on computer.
	Extended Color BASIC	Built in (ROM); chip replaces Color BASIC	Turn on computer.
	Disk Extended Color BASIC	Built into disk-interface cartridge; Extended Color BASIC must be installed in computer	Turn on disk drive; turn on computer.
TRS-80 Models III & 4	Radio Shack Model III BASIC	Built in (ROM)	Cassette systems: turn on computer. Disk systems: turn on computer. Hold down BREAK key and press RESET. Press ENTER at the CASS? prompt.
	Disk BASIC	Loaded from disk	Turn on computer. Place Model III DOS disk in Drive 0. Press RESET. Answer the DATE and TIME prompts. When the DOS prompt appears, type BASIC and press ENTER. Answer each of the prompts: MEMORY SIZE? and HOW MANY FILES? by pressing ENTER.
	BASIC 01.00.00 (Model 4)	Loaded from disk	BASIC 01.00.00 (Model 4 disk systems only): As above for loading Disk BASIC, but use a Model 4 DOS disk.
VIC-20	CBM BASIC	Built in (ROM)	Turn on computer.

**Integer BASIC was supplied with the original Apple IIs and can be loaded from disk into II pluses that have a language card and all IIes and IIcs. Cassette BASIC can be used on disk systems by pressing RESET (on IIes and IIcs you have to hold down the CONTROL key at the same time) after turning on the computer.*

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Take some time to try out the more unusual-looking keys on your keyboard. Your manual will explain any keys you can't figure out yourself. And feel free to press any key or combination of keys; nothing you type can hurt your computer!

(If you own a Timex Sinclair computer, you know that you can use just one key to type a whole command at once. The Timex manuals contain full instructions for using this highly efficient keyboard.)

As you type, you'll notice that the cursor (that special marker the computer display uses to show your typing position) moves to the right, leaving letters in its wake. But when your cursor reaches the right-hand margin, you'll see something unusual. Unlike a typewriter's carriage, which merely rings a bell and eventually refuses to advance, the computer's cursor proceeds to the beginning of the next screen line and continues on its way. The computer doesn't recognize its own margins the way a typewriter does.

To start a new line, you must press your RETURN key. (*See Chart No. 2 to find the corresponding key for your machine.*) This also tells the computer that you've reached the end of a command or of a program line—regardless of how many actual lines it filled on the computer's screen—and that you want it to do something. If you've been typing gibberish, the response you'll most likely get will be SYNTAX ERROR or a similar message. Don't worry; that just means the computer didn't understand your command.

5. Clear the computer's memory. Before you start typing in an actual program, you'll want to get rid of any random typing you've done while experimenting. Type NEW and press your RETURN key. This tells the computer to forget everything you've typed in previously and start with a clean slate.

6. Type in your program, line by line. Now let's do some real programming. Starting with your cursor at the left margin (if it's not already there, press RETURN to get it there), type in your program, pressing RETURN at the end of each numbered line. Or try this little program, which will work on any personal computer and in any BASIC:

```
10 PRINT "WELCOME. I AM HERE TO SERVE YOU IN ANY WAY I CAN."
```

If the letters appear in lowercase, refer to Chart No. 2 under the heading "This Is Your SHIFT LOCK Key" and set your computer for all capital letters; then retype the line. Some BASICs don't understand lowercase letters except in special situations. As a general rule, unless you need to use lowercase letters for some specific purpose, do all your work in BASIC in uppercase only.

If you make a mistake before pressing RETURN, you can use the BACKSPACE key (*check Chart No. 2 for the right key on your machine*) to move the cursor back to the point of the error, type over the mistake, and type in the rest of the line once more. (On Apple computers the letters don't disappear from the screen as you BACKSPACE over them. You have to correct the error and retype the rest of the line anyway.) If any characters left over from the mistake remain on the right side of the cursor after you've reached the end of the line, use the space bar to move the cursor over them and wipe them out. Then move the cursor back to the end of your line—using your BACKSPACE key—before pressing RETURN.

You may not notice a mistake until *after* you've pressed RETURN—or your computer may beep at you and complain that there's something wrong with the line you just entered. In that case, just retype the entire line and press RETURN.

CHART 2 **SOME**

COMPUTER	THIS IS YOUR RETURN KEY:	THIS IS YOUR DELETE KEY:
ADAM	RETURN	←
Apple II series	RETURN	←
Atari Home Computers	RETURN	DEL/BACK S
Commodore 64	RETURN	INST/DEL
IBM PC	↵	DEL
IBM PC*jr*	ENTER	DEL
Texas Instruments 99/4A	ENTER	← Press FCTN and "S" keys simultaneously
Timex Sinclair 1000 & 1500	ENTER	SHIFT-DELETE Press SHIFT and numeral 0 simultaneously
TRS-80 Color Computer	ENTER	←
TRS-80 Model III	ENTER	←
TRS-80 Model 4		
VIC-20	RETURN	INST/DEL

N/A Not Applicable

What you've just entered is a BASIC program line. The number 10 at the front of the line tells the computer that this line may be part of a larger program, so it shouldn't do anything right now but store the line away in its memory. If you enter more lines beginning with different numbers, the numbers will tell the computer the order in which you want it to perform your instructions.

7. Check your typing. Computers are very particular; every space and punctuation mark should be exactly as it appears in the printed listing. To make sure that you've entered the program correctly, type LIST and press RETURN. LIST tells the computer to show you all of your program. But with longer programs, this may result in the listing disappearing off the top of the screen before you can read it. In such a case, you can ask the computer to show you only certain lines, or you can make the computer pause or slow down (*see "How to List a Range of Lines" and "How to Make a Listing Pause" in Chart No. 2*).

Check each program line carefully. If you find an error, retype the entire numbered line and press RETURN; the computer will automatically replace your original version of that line with the new one.

8. Save the program. Some program errors can cause your computer to "lock up" so completely that the only escape is to reset the computer, losing everything you've typed in so far. To guard against this—or to preserve your program for later use—you might want to make a permanent record of your program on tape or disk. See Chart No. 2 for instructions on how to save a program and load it back in.

SPECIAL KEYS AND COMMANDS

Enter the commands below, substituting your own file names or parameters, and press RETURN or ENTER.

THIS IS YOUR SHIFT LOCK KEY:	HOW TO MAKE A LISTING PAUSE	HOW TO STOP A RUNNING PROGRAM	HOW TO LOAD TO/SAVE FROM CASSETTE	HOW TO LOAD TO/SAVE FROM DISK	HOW TO LIST A RANGE OF LINES (e.g., 10 to 100)
LOCK	CONTROL-S (To pause/ resume)	CONTROL-C	LOAD *FILENAME* SAVE *FILENAME*	N/A	LIST 10–100
CAPS LOCK	CONTROL-S (To pause/ resume)	CONTROL-C (All models) CONTROL-RESET (IIe, IIc) RESET (II plus)	CLOAD *FILENAME* CSAVE *FILENAME*	LOAD *FILENAME* SAVE *FILENAME*	LIST 10–100 or LIST 10, 100
SHIFT- CAPS LOWR	CTRL-1 (To pause/ resume)	BREAK	CLOAD or LOAD "C:*FILENAME*" CSAVE or SAVE "C:*FILENAME*"	LOAD "D:*FILENAME*" SAVE "D:*FILENAME*"	LIST 10,100
COMMODORE KEY	CTRL (Press to slow listing; release to resume)	RUN STOP or RUN STOP-RESTORE	LOAD "*FILENAME*" SAVE "*FILENAME*"	LOAD "*FILENAME*",8 SAVE "*FILENAME*",8	LIST 10–100
CAPS LOCK	CTRL-NUM LOCK (To pause) CTRL-SCROLL LOCK (To resume)	CTRL-SCROLL LOCK	CLOAD "*FILENAME*" CSAVE "*FILENAME*"	LOAD "*FILENAME*" SAVE "*FILENAME*"	LIST 10–100
CAPS LOCK	FN-PAUSE (To pause; any key to resume)	FN-BREAK	CLOAD "*FILENAME*" CSAVE "*FILENAME*"	LOAD "*FILENAME*" SAVE "*FILENAME*"	LIST 10–100
ALPHA LOCK	N/A	FCTN-CLEAR ("4" key)	OLD CS1 SAVE CS1	OLD DSK1.*FILENAME* SAVE DSK1.*FILENAME*	LIST 10–100
(Uppercase only)	Listing pauses automatically when screen is full	SPACE	LOAD "*FILENAME*" SAVE "*FILENAME*"	N/A	LIST 10 (Line 10 becomes line displayed at top of screen)
SHIFT-0 (Lowercase appears as inverse)	SHIFT-@ (To pause; press any key to resume)	BREAK	CLOAD "*FILENAME*" CSAVE "*FILENAME*"	LOAD "*FILENAME*" SAVE "*FILENAME*"	LIST 10–100
SHIFT-0 CAPS	SHIFT-@ (To pause; any key to resume)	BREAK	CLOAD "*FILENAME*" CSAVE "*FILENAME*"	LOAD "*FILENAME*" SAVE "*FILENAME*"	LIST 10–100
COMMODORE KEY	CTRL (Press to slow listing; release to resume)	RUN STOP or RUN STOP-RESTORE	LOAD "*FILENAME*" SAVE "*FILENAME*"	LOAD "*FILENAME*",8 SAVE "*FILENAME*",8	LIST 10–100

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9. Run the program. When you're satisfied that your program is correct, type RUN and press RETURN. If you're lucky, it'll do exactly what it's supposed to do! (Our little program above should print WELCOME. I AM HERE TO SERVE YOU IN ANY WAY I CAN. on your screen.)

10. "Debug" the program. If the program worked, congratulations! But generally speaking, any substantial program you type in won't work on the first go around. If your program contains "bugs" (errors), one of three things may happen.

PROBLEM: The program may run but not do what it's supposed to do. Graphics may be misshapen, for example, or the program may print nonsense on the screen.

SOLUTION: LIST the program and double-check each line carefully. If you find an error, the easiest thing to do at this stage is to type the whole of the line that contains the error into the computer again and press RETURN.

(Most computers offer much more efficient means of correcting typographical mistakes than retyping an entire line. Advanced editing functions are generally system specific, though, and mastery of them can be delayed until you are more familiar with the keyboard. Consult your manuals for further information.)

PROBLEM: The program may stop and print an error message on the screen like SYNTAX ERROR IN 10 or BAD VALUE IN 550. (At this point Radio Shack computers may automatically go into a special editing mode: They'll display the line number at the left margin. Unless you've learned the special TRS-80 editing commands, press RETURN.)

SOLUTION: Type LIST followed by the specified line number and press RETURN. Check the line very carefully and enter it again if necessary. If it looks correct—and the error message was something other than SYNTAX ERROR—then the error is elsewhere in the program; you must double-check every line, unless you understand programming well enough to interpret the error message. (Example: if you get an OUT OF DATA IN LINE 360, the error may not be in LINE 360 but rather in a DATA statement.) If you have a printer, printing out a copy of the program can very often help you find errors (see your computer's manual).

PROBLEM: The program runs and runs and won't stop.

SOLUTION: See "How to Stop a Running Program" in Chart No. 2. Once you've stopped the program, double-check each line and correct as necessary.

When you've found and corrected all the typing errors in your program, save the final version and try typing RUN (and pressing RETURN) again. If the program *still* doesn't work as it's expected to, you may have missed something. Chances are that one or two rounds of error checking will fix all but the most recalcitrant problems. As you learn more and more about the way BASIC works, you will quickly become able to anticipate likely places where errors can occur. (A tip: Start by checking DATA statements and other tricky typing; then look for missing lines and for zeros where letter "O"s should be, and vice versa.)

11. Have some fun! After you've enjoyed the program, feel free to experiment with changes. You can customize most programs to work just the way you want (slower, faster, different words on the screen, etc.). The great thing about BASIC is that it's very easy to change one line at a time, then find out immediately what happens. Playing around with programs is the best way to learn quickly. And if you find ways to improve programs we've published, let us know!

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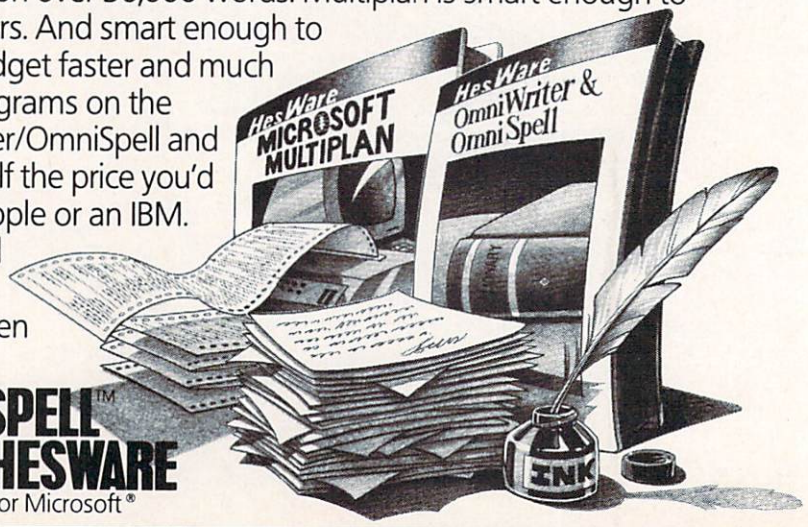

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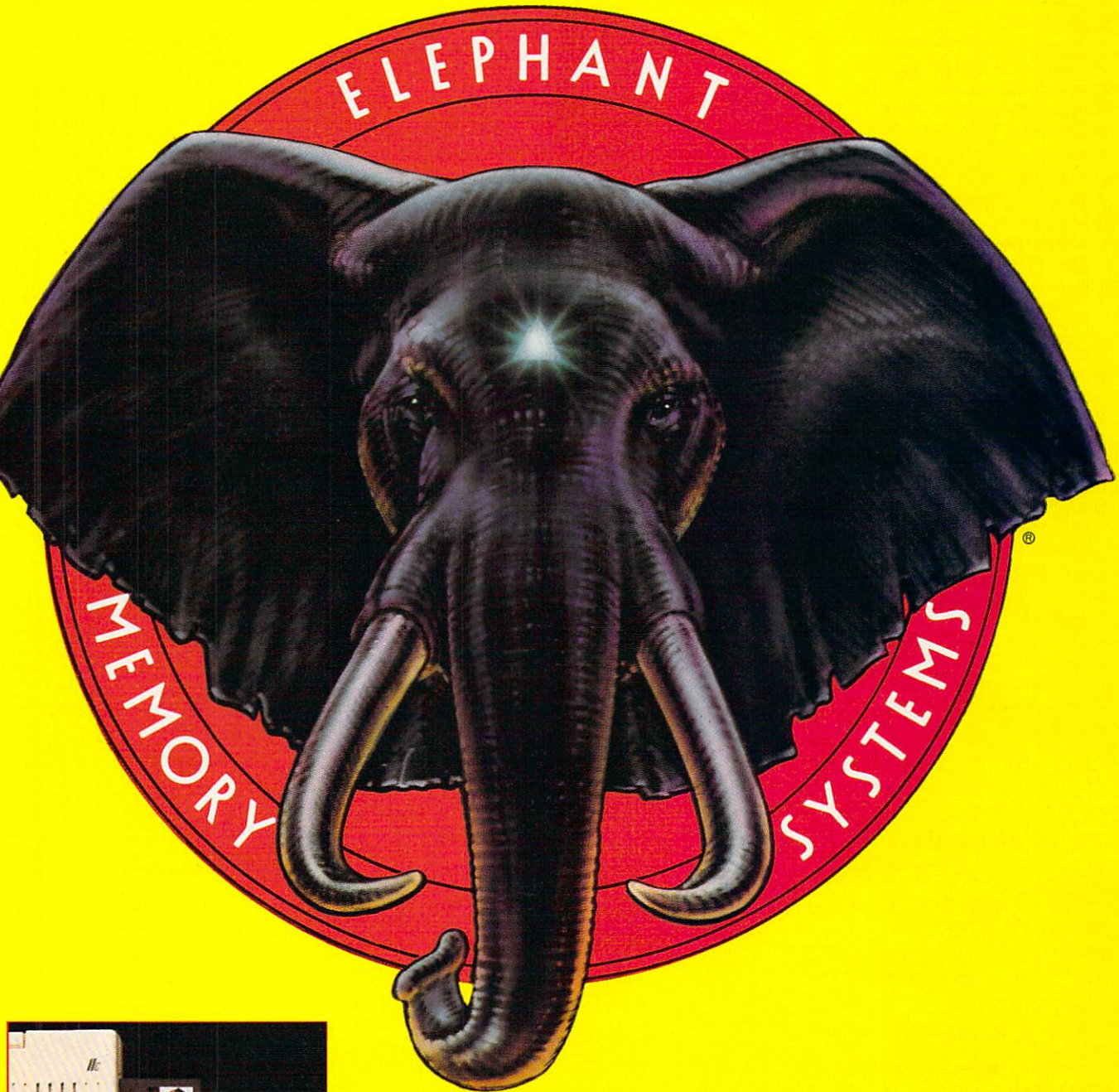

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DIAL-A-WORD

BY JOEY LATIMER

Quick: What was your last telephone number? You can't remember? What if you had to remember a word instead, such as HIC-CUPS (442-2877) or CAB-BAGE (222-2243)?

There are many words hidden in a telephone number. Since each of the digits 2 through 9 on a phone dial stands for three possible letters of the alphabet, a single, seven-digit phone number can represent up to 2,187 letter combinations!

Of course, you'd never want to take the trouble of working out all the possible combinations yourself—but, now your computer can do it for you!

Simply type in *Dial-A-Word* and RUN it. You'll be asked to enter a seven-digit telephone number (no area codes or extensions, please!). Type in the digits without any spaces or punctuation marks between them, like this: 5558888.

Press RETURN or ENTER and watch as your computer generates every possible letter combination for those numbers. Some of these letters will form gibberish, but others (or combinations of several) will form into a word or words that you won't ever forget! And when you're ready to dial a phone number, just use the letters that accompany the digits on a telephone dial. (Note: Neither 1 nor 0 is accompanied by letters on a telephone dial; they'll remain as digits within the letter combinations.)

ADAM/*Dial-A-Word*

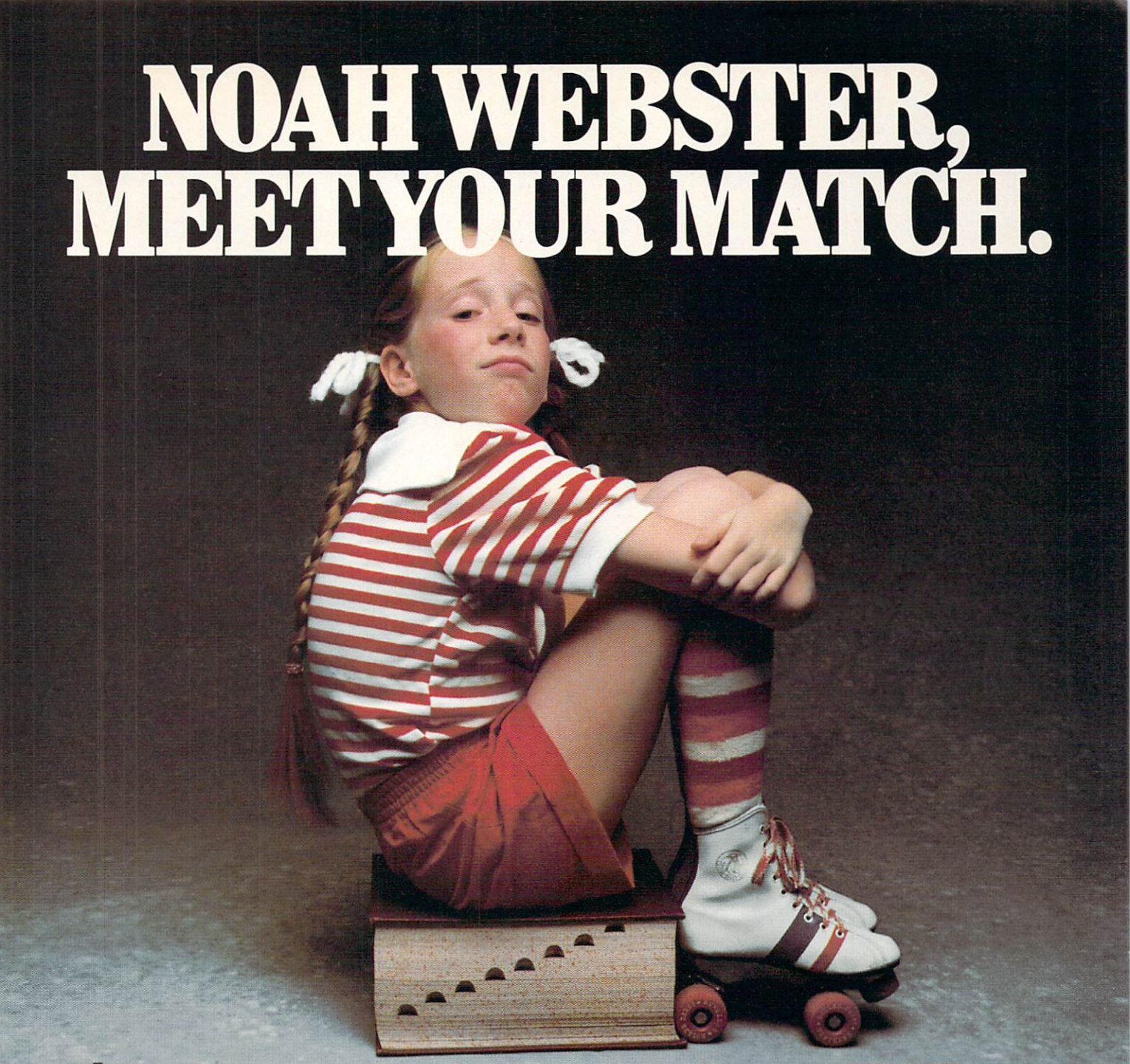
```
9 REM --INITIALIZE VARIABLES--
10 DIM a(7)
20 a$ = "ABCDEFGHIJKLMNOPRSTUVWXY"
30 FOR i = 1 TO 7
40 a(i) = 0
50 NEXT i
60 np = 0
70 fl = 0
79 REM --GET TELEPHONE NUMBER--
80 HOME
90 PRINT TAB(10);"DIAL-A-WORD"
100 PRINT
110 PRINT "PLEASE TYPE IN A 7-DIGIT PHONE NUMBER"
120 PRINT "(IN THIS FORM: 5558888);"
130 PRINT "THEN PRESS <RETURN>."
140 PRINT
150 INPUT "NUMBER? ";n$
159 REM --CHECK FOR ERRORS IN INPUT--
160 IF LEN(n$) <> 7 THEN 80
170 FOR i = 1 TO 7
180 IF MID$(n$,i,1) < "0" OR MID$(n$,i,1) > "9" THEN f
l = 1
190 NEXT i
200 IF fl <> 0 THEN 70
210 HOME
219 REM --PRINT CURRENT COMBINATION OF LETTERS--
220 FOR i = 1 TO 7
230 IF MID$(n$,i,1) < "2" THEN PRINT MID$(n$,i,1);:GOT
0 250
240 PRINT MID$(a$,VAL(MID$(n$,i,1))*3-5+a(i),1);
250 NEXT i
260 PRINT SPC(3);
270 np = np+1
280 IF np/3 <> INT(np/3) THEN 300
290 PRINT
300 IF np < 63 THEN 380
309 REM --IF SCREEN FULL, PRINT MESSAGE--
310 PRINT
320 PRINT "PRESS <C> TO CONTINUE, <Q> TO  QUIT.";
330 GET k$
340 IF k$ = "Q" THEN END
350 IF k$ <> "C" THEN 330
360 np = 0
370 HOME
379 REM --PRODUCE NEXT COMBINATION--
380 p = 1
390 a(p) = a(p)+1
400 IF a(p) < 3 AND MID$(n$,p,1) > "1" THEN 220
410 a(p) = 0
420 p = p+1
430 IF p < 8 THEN 390
440 PRINT
450 PRINT "DONE!"
460 END
```

Apple/*Dial-A-Word*

```
10 DIM A(7)
20 A$ = "ABCDEFGHIJKLMNOPRSTUVWXY"
30 FOR I = 1 TO 7
40 A(I) = 0
50 NEXT I
60 NP = 0
70 FL = 0
79 REM --GET TELEPHONE NUMBER--
80 HOME
90 PRINT TAB(15);"DIAL-A-WORD"
100 PRINT
110 PRINT "PLEASE TYPE IN A 7-DIGIT PHONE NUMBER"
120 PRINT "(IN THIS FORM: 5558888);"
130 PRINT "THEN PRESS <RETURN>."
140 PRINT
150 INPUT "NUMBER? ";N$
159 REM --CHECK FOR ERRORS IN INPUT--
160 IF LEN(N$) <> 7 THEN 80
170 FOR I = 1 TO 7
180 IF MID$(N$,I,1) < "0" OR MID$(N$,I,1) > "9" THEN F
L = 1
190 NEXT I
200 IF FL <> 0 THEN 70
210 HOME
219 REM --PRINT CURRENT COMBINATION OF LETTERS--
220 FOR I = 1 TO 7
230 IF MID$(N$,I,1) < "2" THEN PRINT MID$(N$,I,1);:GOT
0 250
240 PRINT MID$(A$,VAL(MID$(N$,I,1)) * 3 - 5 + A(I),1);
250 NEXT I
260 PRINT " ";
270 NP = NP + 1
280 IF NP < 110 THEN 360
289 REM --IF SCREEN FULL, PRINT MESSAGE--
290 PRINT
300 PRINT "PRESS <C> TO CONTINUE, <Q> TO QUIT.";
309 REM --WAIT FOR KEY TO BE PRESSED--
310 GET K$
320 IF K$ = "Q" THEN END
330 IF K$ <> "C" THEN 310
340 NP = 0
```

ILLUSTRATIONS BY JOSH GOSFIELD

NOAH WEBSTER, MEET YOUR MATCH.



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```
350 HOME
359 REM --PRODUCE NEXT COMBINATION--
360 P = 1
370 A(P) = A(P) + 1
380 IF A(P) < 3 AND MID$(N$,P,1) > "1" THEN 220
390 A(P) = 0
400 P = P + 1
410 IF P < 8 THEN 370
420 PRINT
430 PRINT "DONE!"
440 END
```

Atari/*Dial-A-Word*

```
10 DIM A(7),A$(24),N$(7),T$(1)
20 OPEN #1,4,0,"K:"
29 REM --SET SCREEN WIDTH TO 40 COLUMNS--
30 POKE 82,0
39 REM --INITIALIZE VARIABLES--
40 A$="ABCDEFGHIJKLMNOPRSTUVWXY"
50 FOR I=1 TO 7
60 A(I)=0
70 NEXT I
80 NP=0
90 FL=0
99 REM --GET TELEPHONE NUMBER--
100 PRINT CHR$(125)
110 POSITION 14,0
120 PRINT "DIAL-A-WORD"
130 PRINT
140 PRINT "PLEASE TYPE IN A 7-DIGIT PHONE NUMBER"
150 PRINT "(IN THIS FORM: 5558888);"
160 PRINT "THEN PRESS RETURN"
170 PRINT
180 PRINT "NUMBER";
190 INPUT N$
199 REM --CHECK FOR ERRORS IN INPUT--
200 IF LEN(N$)<>7 THEN 100
210 FOR I=1 TO 7
220 IF N$(I,I)<"0" OR N$(I,I)>"9" THEN FL=1
230 NEXT I
240 IF FL<>0 THEN 90
250 PRINT CHR$(125);
259 REM --PRINT CURRENT COMBINATION OF LETTERS--
260 FOR I=1 TO 7
270 T$=N$(I,I)
280 IF T$<"2" THEN PRINT T$;:GOTO 310
290 T=VAL(T$)*3-5+A(I)
300 PRINT A$(T,T);
310 NEXT I
320 PRINT " ";
330 NP=NP+1
340 IF NP<110 THEN 420
349 REM --IF SCREEN FULL, PRINT MESSAGE--
350 PRINT
360 PRINT "PRESS <C> TO CONTINUE, <Q> TO QUIT.";
369 REM --WAIT FOR KEYPRESS--
370 GET #1,K
380 IF K=81 THEN END
390 IF K<>67 THEN 370
400 NP=0
410 PRINT CHR$(125);
419 REM --PRODUCE NEXT COMBINATION--
420 P=1
430 A(P)=A(P)+1
440 IF A(P)<3 AND N$(P,P)>"1" THEN 260
450 A(P)=0
460 P=P+1
470 IF P<8 THEN 430
480 PRINT
490 PRINT "DONE!"
500 END
```

Commodore 64/*Dial-A-Word*

```
10 DIM A(7)
20 A$="ABCDEFGHIJKLMNOPRSTUVWXY"
30 FOR I=1 TO 7
40 A(I)=0
50 NEXT I
60 NP=0
70 FL=0
79 REM --GET TELEPHONE NUMBER--
80 PRINT CHR$(147);TAB(15);"DIAL-A-WORD"
90 PRINT
100 PRINT "PLEASE TYPE IN A 7-DIGIT PHONE NUMBER"
110 PRINT "(IN THIS FORM: 5558888);"
120 PRINT "THEN PRESS <RETURN>."
130 PRINT
140 INPUT "NUMBER";N$
149 REM --CHECK FOR ERRORS IN INPUT--
150 IF LEN(N$)<>7 THEN 80
160 FOR I=1 TO 7
170 IF MID$(N$,I,1)<"0" OR MID$(N$,I,1)>"9" THEN FL=1
180 NEXT I
190 IF FL<>0 THEN 70
200 PRINT CHR$(147);
209 REM --PRINT CURRENT COMBINATION OF LETTERS--
210 FOR I=1 TO 7
220 IF MID$(N$,I,1)<"2" THEN PRINT MID$(N$,I,1);:GOTO
240
230 PRINT MID$(A$,VAL(MID$(N$,I,1))*3-5+A(I),1);
240 NEXT I
250 PRINT " ";
260 NP=NP+1
270 IF NP<110 THEN 350
279 REM --IF SCREEN FULL, PRINT MESSAGE--
280 PRINT
290 PRINT "PRESS <C> TO CONTINUE, <Q> TO QUIT.";
299 REM --WAIT FOR KEY TO BE PRESSED--
300 GET K$
310 IF K$="Q" THEN END
320 IF K$<>"C" THEN 300
330 NP=0
340 PRINT CHR$(147);
349 REM --PRODUCE NEXT COMBINATION--
350 P=1
360 A(P)=A(P)+1
370 IF A(P)<3 AND MID$(N$,P,1)>"1" THEN 210
380 A(P)=0
390 P=P+1
400 IF P<8 THEN 360
410 PRINT
420 PRINT "DONE!"
430 END
```

IBM PCs/*Dial-A-Word*

```
10 DIM A(7)
20 A$="ABCDEFGHIJKLMNOPRSTUVWXY"
30 FOR I=1 TO 7
40 A(I)=0
50 NEXT I
60 NP=0
70 FL=0
79 REM --GET TELEPHONE NUMBER--
80 CLS
90 PRINT TAB(15);"DIAL-A-WORD"
100 PRINT
110 PRINT "PLEASE TYPE IN A 7-DIGIT PHONE NUMBER"
120 PRINT "(IN THIS FORM: 5558888);"
130 PRINT "THEN PRESS <ENTER>."
140 PRINT
150 INPUT "NUMBER";N$
159 REM --CHECK FOR ERRORS IN INPUT--
160 IF LEN(N$)<>7 THEN 80
170 FOR I=1 TO 7
180 IF MID$(N$,I,1)<"0" OR MID$(N$,I,1)>"9" THEN FL=1
190 NEXT I
200 IF FL<>0 THEN 70 ELSE CLS
209 REM --PRINT CURRENT COMBINATION OF LETTERS--
210 FOR I=1 TO 7
220 IF MID$(N$,I,1)<"2" THEN PRINT MID$(N$,I,1);:GOTO
240
```

→

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```
230 PRINT MID$(A$,VAL(MID$(N$,I,1))*3-5+A(I),1);
240 NEXT I
250 PRINT " ";
260 NP=NP+1
270 IF NP<110 THEN 350
279 REM --IF SCREEN FULL, PRINT MESSAGE--
280 PRINT
290 PRINT "PRESS <C> TO CONTINUE, <Q> TO QUIT.";
299 REM --WAIT FOR KEY TO BE PRESSED--
300 K$=INKEY$
310 IF K$="Q" THEN END
320 IF K$<>"C" THEN 300
330 NP=0
340 CLS
349 REM --PRODUCE NEXT COMBINATION--
350 P=1
360 A(P)=A(P)+1
370 IF A(P)<3 AND MID$(N$,P,1)>"1" THEN 210
380 A(P)=0
390 P=P+1
400 IF P<8 THEN 360
410 PRINT
420 PRINT "DONE!"
430 END
```

TI-99/4A/*Dial-A-Word*

```
10 DIM A(7)
20 A$="ABCDEFGHIJKLMNOPRSTUVWXY"
30 FOR I=1 TO 7
40 A(I)=0
50 NEXT I
60 NP=0
70 FL=0
79 REM --GET TELEPHONE NUMBER--
80 CALL CLEAR
90 PRINT TAB(10);"DIAL-A-WORD"
100 PRINT
110 PRINT "PLEASE TYPE IN A 7-DIGIT"
120 PRINT "PHONE NUMBER":"(IN THIS FORM: 5558888);"
130 PRINT "THEN PRESS <ENTER>."
140 PRINT
150 INPUT "NUMBER? ":N$
159 REM --CHECK FOR ERRORS IN INPUT--
160 IF LEN(N$)<>7 THEN 80
170 FOR I=1 TO 7
180 IF (SEG$(N$,I,1)>="0")*(SEG$(N$,I,1)<="9") THEN 20
0
190 FL=1
200 NEXT I
210 IF FL<>0 THEN 70
220 CALL CLEAR
229 REM --PRINT CURRENT COMBINATION OF LETTERS--
230 FOR I=1 TO 7
240 IF SEG$(N$,I,1)>="2" THEN 270
250 PRINT SEG$(N$,I,1);
260 GOTO 280
270 PRINT SEG$(A$,VAL(SEG$(N$,I,1))*3-5+A(I),1);
280 NEXT I
290 PRINT "  ";
300 NP=NP+1
310 IF NP/3<>INT(NP/3) THEN 330
320 PRINT
330 IF NP<63 THEN 410
339 REM --IF SCREEN FULL, PRINT MESSAGE--
340 PRINT
350 PRINT "PRESS <C> TO CONTINUE,":"<Q> TO QUIT.";
359 REM --WAIT FOR KEY TO BE PRESSED--
360 CALL KEY(3,K,S)
370 IF K=81 THEN 480
380 IF K<>67 THEN 360
390 NP=0
400 CALL CLEAR
409 REM --PRODUCE NEXT COMBINATION--
410 P=1
420 A(P)=A(P)+1
430 IF (A(P)<3)*(SEG$(N$,P,1)>"1") THEN 230
440 A(P)=0
450 P=P+1
460 IF P<8 THEN 420
470 PRINT
480 END
```

Timex Sinclair 1000 & 1500/*Dial-A-Word*

```
10 DIM A(7)
20 LET A$="ABCDEFGHIJKLMNOPRSTUVWXY"
30 LET NP=0
40 FOR I=1 TO 7
50 LET A(I)=0
60 NEXT I
70 SLOW
80 LET FL=0
89 REM --GET TELEPHONE NUMBER--
90 CLS
100 PRINT TAB 10;"DIAL-A-WORD"
110 PRINT
120 PRINT "PLEASE TYPE IN A 7-DIGIT PHONE","NUMBER (I
N THIS FORM: 5558888);"
130 PRINT "THEN PRESS <ENTER>."
140 PRINT
150 PRINT "NUMBER? ";
160 INPUT N$
170 PRINT N$
179 REM --CHECK FOR ERRORS IN INPUT--
180 IF LEN N$<>7 THEN GOTO 90
190 FOR I=1 TO 7
200 IF N$(I)<"0" OR N$(I)>"9" THEN LET FL=1
210 NEXT I
220 IF FL<>0 THEN GOTO 80
230 CLS
239 REM --PRINT CURRENT COMBINATION OF LETTERS--
240 FOR I=1 TO 7
250 IF N$(I)>="2" THEN GOTO 280
260 PRINT N$(I);
270 GOTO 290
280 PRINT A$(VAL (N$(I))*3-5+A(I));
290 NEXT I
300 PRINT " ";
310 LET NP=NP+1
320 IF NP<76 THEN GOTO 410
329 REM --IF SCREEN FULL, PRINT MESSAGE--
330 PRINT
340 PRINT
350 PRINT "PRESS <C> TO CONTINUE,","<Q> TO QUIT."
359 REM --WAIT FOR KEY TO BE PRESSED--
360 PAUSE 4E4
370 IF INKEY$="Q" THEN STOP
380 IF INKEY$<>"C" THEN GOTO 360
390 LET NP=0
400 CLS
409 REM --PRODUCE NEXT COMBINATION--
410 LET P=1
420 LET A(P)=A(P)+1
430 IF A(P)<3 AND N$(P)>"1" THEN GOTO 240
440 LET A(P)=0
450 LET P=P+1
460 IF P<8 THEN GOTO 420
470 PRINT
480 PRINT "DONE."
490 STOP
```

TRS-80 Color Computer/*Dial-A-Word*

```
10 DIM A(7)
20 A$="ABCDEFGHIJKLMNOPRSTUVWXY"
30 FOR I=1 TO 7
40 A(I)=0
50 NEXT I
60 NP=0
```

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and struggle against obstacles in the sea.
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and probe with sound to solve a mystery.
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Day

Middle of the Road Lizard

```
70 FL=0
79 REM --GET TELEPHONE NUMBER--
80 CLS
90 PRINT TAB(10);"DIAL-A-WORD"
100 PRINT
110 PRINT "PLEASE TYPE IN A 7-DIGIT PHONE"
120 PRINT "NUMBER (IN THIS FORM: 5558888);"
130 PRINT "THEN PRESS <ENTER>."
140 PRINT
150 INPUT "NUMBER";N$
159 REM --CHECK FOR ERRORS IN INPUT--
160 IF LEN(N$)<>7 THEN 80
170 FOR I=1 TO 7
180 IF MID$(N$,I,1)<"0" OR MID$(N$,I,1)>"9" THEN FL=1
190 NEXT I
200 IF FL<>0 THEN 70 ELSE CLS
209 REM --PRINT CURRENT COMBINATION OF LETTERS--
210 FOR I=1 TO 7
220 IF MID$(N$,I,1)<"2" THEN PRINT MID$(N$,I,1);:GOTO
240
230 PRINT MID$(A$,VAL(MID$(N$,I,1))*3-5+A(I),1);
240 NEXT I
250 PRINT " ";
260 NP=NP+1
270 IF NP<52 THEN 350
279 REM --IF SCREEN FULL, PRINT MESSAGE--
280 PRINT
290 PRINT "PRESS <C> TO CONTINUE,","<Q> TO QUIT.";
299 REM --WAIT FOR KEY TO BE PRESSED--
300 K$=INKEY$
310 IF K$="Q" THEN END
320 IF K$<>"C" THEN 300
330 NP=0
340 CLS
349 REM --PRODUCE NEXT COMBINATION--
350 P=1
360 A(P)=A(P)+1
370 IF A(P)<3 AND MID$(N$,P,1)>"1" THEN 210
380 A(P)=0
390 P=P+1
400 IF P<8 THEN 360
410 PRINT
420 PRINT "DONE!"
430 END
```

TRS-80 Model III/*Dial-A-Word*

```
10 DIM A(7)
20 A$="ABCDEFGHIJKLMNOPRSTUVWXY"
30 FOR I=1 TO 7
40 A(I)=0
50 NEXT I
60 NP=0
70 FL=0
79 REM --GET TELEPHONE NUMBER--
80 CLS
90 PRINT TAB(25);"DIAL-A-WORD"
100 PRINT
110 PRINT "PLEASE TYPE IN A 7-DIGIT PHONE NUMBER (IN T
HIS FORM: 5558888);"
120 PRINT "THEN PRESS <ENTER>."
130 PRINT
140 INPUT "NUMBER";N$
149 REM --CHECK FOR ERRORS IN INPUT--
150 IF LEN(N$)<>7 THEN 80
160 FOR I=1 TO 7
170 IF MID$(N$,I,1)<"0" OR MID$(N$,I,1)>"9" THEN FL=1
180 NEXT I
190 IF FL<>0 THEN 70 ELSE CLS
199 REM --PRINT CURRENT COMBINATION OF LETTERS--
200 FOR I=1 TO 7
210 IF MID$(N$,I,1)<"2" THEN PRINT MID$(N$,I,1);:GOTO
230
220 PRINT MID$(A$,VAL(MID$(N$,I,1))*3-5+A(I),1);
230 NEXT I
240 PRINT " ";
250 NP=NP+1
260 IF NP<112 THEN 340
269 REM --IF SCREEN FULL, PRINT MESSAGE--
270 PRINT
280 PRINT CHR$(12);"PRESS <C> TO CONTINUE, <Q> TO QUIT
.";
289 REM --WAIT FOR KEY TO BE PRESSED--
290 K$=INKEY$
300 IF K$="Q" THEN END
310 IF K$<>"C" THEN 290
320 NP=0
330 CLS
339 REM --PRODUCE NEXT COMBINATION--
340 P=1
350 A(P)=A(P)+1
360 IF A(P)<3 AND MID$(N$,P,1)>"1" THEN 200
370 A(P)=0
380 P=P+1
390 IF P<8 THEN 350
400 PRINT
410 PRINT "DONE!"
420 END
```

VIC-20/*Dial-A-Word*

```
10 DIM A(7)
20 A$="ABCDEFGHIJKLMNOPRSTUVWXY"
30 FOR I=1 TO 7
40 A(I)=0
50 NEXT I
60 NP=0
70 FL=0
79 REM --GET TELEPHONE NUMBER--
80 PRINT CHR$(147);TAB(6);"DIAL-A-WORD"
90 PRINT
100 PRINT "PLEASE TYPE IN A","7-DIGIT PHONE NUMBER"
110 PRINT "IN THIS FORM: 5558888;";
120 PRINT "THEN PRESS <RETURN>."
130 PRINT
140 INPUT "NUMBER";N$
149 REM --CHECK FOR ERRORS IN INPUT--
150 IF LEN(N$)<>7 THEN 80
160 FOR I=1 TO 7
170 IF MID$(N$,I,1)<"0" OR MID$(N$,I,1)>"9" THEN FL=1
180 NEXT I
190 IF FL<>0 THEN 70
200 PRINT CHR$(147);
209 REM --PRINT CURRENT COMBINATION OF LETTERS--
210 FOR I=1 TO 7
220 IF MID$(N$,I,1)<"2" THEN PRINT MID$(N$,I,1);:GOTO
240
230 PRINT MID$(A$,VAL(MID$(N$,I,1))*3-5+A(I),1);
240 NEXT I
250 PRINT SPC(4);
260 NP=NP+1
270 IF NP<40 THEN 350
279 REM --IF SCREEN FULL, PRINT MESSAGE--
280 PRINT
290 PRINT "PRESS <C> TO CONTINUE,";"<Q> TO QUIT.";
299 REM --WAIT FOR KEY TO BE PRESSED--
300 GET K$
310 IF K$="Q" THEN END
320 IF K$<>"C" THEN 300
330 NP=0
340 PRINT CHR$(147);
349 REM --PRODUCE NEXT COMBINATION--
350 P=1
360 A(P)=A(P)+1
370 IF A(P)<3 AND MID$(N$,P,1)>"1" THEN 210
380 A(P)=0
390 P=P+1
400 IF P<8 THEN 360
410 PRINT
420 PRINT "DONE!"
430 END
```

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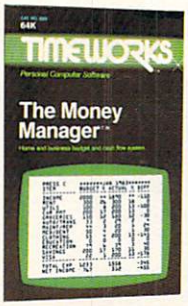

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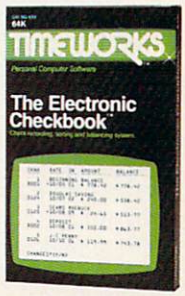

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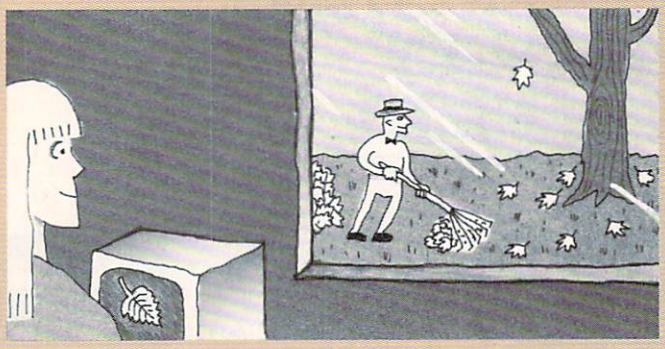
FALLING AGAIN

BY JOEY LATIMER



Fall has arrived and the trees that provided comforting shade during the hot summer months are now shedding their leaves. Overnight, the weather has taken a turn for the colder, and up and down the block the scraping of rakes can be heard.

While your neighbors are hard at work, you can sit back in your easy chair and enjoy the change of seasons without lifting a rake! Type *Falling Again* into your computer, RUN it, and watch our fall tree change color and slowly shed its leaves, one by one, until all its branches are bare.

ADAM/*Falling Again*

```
10 DIM r(15),c(15),b(15)
20 HOME
30 GR
39 REM --DRAW IN LARGE, REGULAR AREAS OF PICTURE--
40 FOR x = 1 TO 10
50 READ ko,r1,r2,c1,c2
60 COLOR = ko
70 FOR y = r1 TO r2
80 HLIN c1,c2 AT y
90 NEXT y,x
99 REM --DRAW BRANCHES OF TREE--
100 FOR x = 1 TO 46
110 READ br,bc
120 PLOT br,bc
130 NEXT x
139 REM --DRAW LEAVES--
140 COLOR = 4
150 FOR x = 1 TO 15
160 READ r(x),c(x),b(x)
170 PLOT r(x),c(x)
180 NEXT x
189 REM --MAKE THE LEAVES FALL--
190 COLOR = 13
200 FOR x = 1 TO 15
210 PLOT r(x),c(x)
220 FOR t = 1 TO RND(1)*1100+1
230 NEXT t
240 COLOR = 2
250 PLOT r(x),c(x)
260 FOR y = c(x)+1 TO b(x)-1
270 hk = SCRN(r(x),y)
280 COLOR = 13
290 PLOT r(x),y
300 FOR t = 1 TO 10+RND(1)*200
310 NEXT t
320 COLOR = hk
330 PLOT r(x),y
340 NEXT y
350 COLOR = 13
360 PLOT r(x),b(x)
370 NEXT x
379 REM --PAUSE; THEN PRINT CLOSING MESSAGE--
380 FOR t = 1 TO 2500
390 NEXT t
400 VTAB 22
410 PRINT "PRESS <R> FOR AN INSTANT REPLAY";
420 PRINT "OR <Q> TO QUIT.";
429 REM --WHEN KEY IS PRESSED, STOP OR START OVER--
430 GET k$
440 IF k$ = "Q" OR k$ = "q" THEN TEXT:END
450 IF k$ = "R" OR k$ = "r" THEN RESTORE:GOTO 20
460 GOTO 430
1000 DATA 2,0,28,0,39,4,29,39,0,39,13,4,4,38,39
1010 DATA 13,3,3,37,39,13,2,2,36,39,13,0,1,35,39
1020 DATA 3,38,38,9,13,3,37,37,10,12,3,14,37,10,11
1030 DATA 3,12,13,10,10
1040 DATA 9,17,8,16,7,17,12,15,13,15,14,15,15,16,13
2000 DATA 14,13,13,14,12,15,11,16,11,9,13,8,12,7
2010 DATA 13,6,14,9,11,9,10,8,9,7,8,6,9,5,10,3,10
2020 DATA 5,12,4,11,6,7,5,6,11,11,12,11,13,10,14,9
2030 DATA 15,8,16,8,17,7,12,9,11,8,10,7,9,6,9,8,12
3000 DATA 7,11,6,13,6,12,5,11,4,12,3,13,3,14,7,35,4
3010 DATA 13,37,15,17,38,13,4,39,2,11,36,8,5,38,16
3020 DATA 12,36,5,7,35,6,15,37,17,8,35,7,18,39,12
3030 DATA 12,36,10,5,39,8,10,36,9,14,37
```

Apple/*Falling Again*

```
10 DIM R(15),C(15),B(15)
20 HOME
30 GR
39 REM --DRAW IN LARGE, REGULAR AREAS OF PICTURE--
40 FOR X = 1 TO 10
50 READ KO,R1,R2,C1,C2
60 COLOR= KO
70 FOR Y = R1 TO R2
80 HLIN C1,C2 AT Y
90 NEXT Y,X
99 REM --DRAW BRANCHES OF TREE--
100 FOR X = 1 TO 46
110 READ BR,BC
120 PLOT BR,BC
130 NEXT X
139 REM --DRAW LEAVES--
140 COLOR= 4
150 FOR X = 1 TO 15
160 READ R(X),C(X),B(X)
170 PLOT R(X),C(X)
180 NEXT X
189 REM --MAKE THE LEAVES FALL--
190 COLOR= 13
200 FOR X = 1 TO 15
210 PLOT R(X),C(X)
220 FOR T = 1 TO RND(1) * 800 + 1
230 NEXT T
240 COLOR= 6
250 PLOT R(X),C(X)
260 FOR Y = C(X) + 1 TO B(X) - 1
270 HK = SCRN(R(X),Y)
280 COLOR= 13
290 PLOT R(X),Y
300 FOR T = 1 TO 10 + RND(1) * 70
310 NEXT T
320 COLOR= HK
330 PLOT R(X),Y
340 NEXT Y
350 COLOR= 13
360 PLOT R(X),B(X)
370 NEXT X
379 REM --PAUSE; THEN PRINT CLOSING MESSAGE--
380 FOR T = 1 TO 2000
390 NEXT T
400 VTAB 22
410 PRINT "PRESS <R> FOR AN INSTANT REPLAY"
420 PRINT "OR <Q> TO QUIT.";
429 REM --WHEN KEY IS PRESSED, STOP OR START OVER--
430 GET K$
```

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At Scholastic, we have something no other educational software company has: 60 years' experience making learning fun for kids.

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Now we've put everything we've learned from five generations of school children into the most innovative family of educational software available today. Scholastic Wizware.™

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But by far the most important result of our experience is that your children will thoroughly enjoy learning with Wizware.

There are now Wizware programs for teaching everything from creative writing to computer programming. Here are a few of the ways we bring learning into the Computer Age.

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It's the most ingenious way ever devised for teaching spelling and improving reading skills. Deep beneath the sea lie giant words covered by a strange seaweed called lettermoss. Kids must face ferocious sharks and pesky flippernippers to remove the lettermoss and decipher the words.

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Agent U.S.A. turns geography into an exciting race to save the nation from the ruthless Fuzzbomb. Along with learning geography, children hone their problem-solving and reasoning abilities.

Story Tree.™
Story Tree can bring out the Mark Twain in every child. Budding authors create their own mystery and adventure stories. A remarkable feature lets them weave alternate choices into every turn of the plot, and challenges their imaginations to the maximum.

Bannercatch.™
Based on the classic game of Capture-the-Flag, this is the most sophisticated and fun strategy game for kids available today. Not only do players learn how to devise complex strategies, they also learn how to work together to solve difficult problems.

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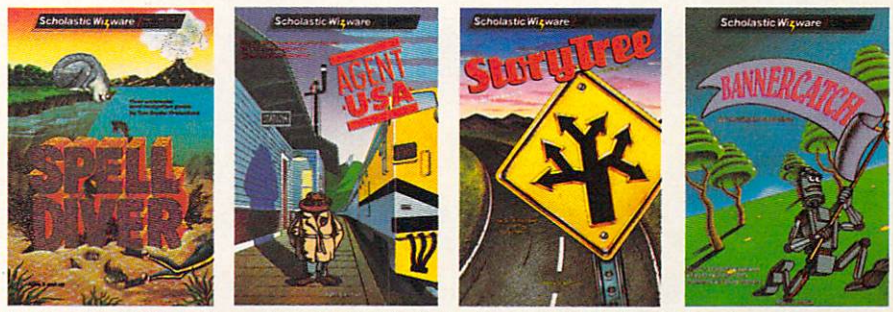


Spelldiver, Agent U.S.A. and Bannercatch designed and developed by Tom Snyder Productions, Inc. Story Tree designed and developed by George Brackett. • Agent U.S.A. and Bannercatch available in Atari, Commodore, Apple and IBM versions. • Spelldiver available in Atari, Commodore and Apple versions. • Story Tree available for Apple.

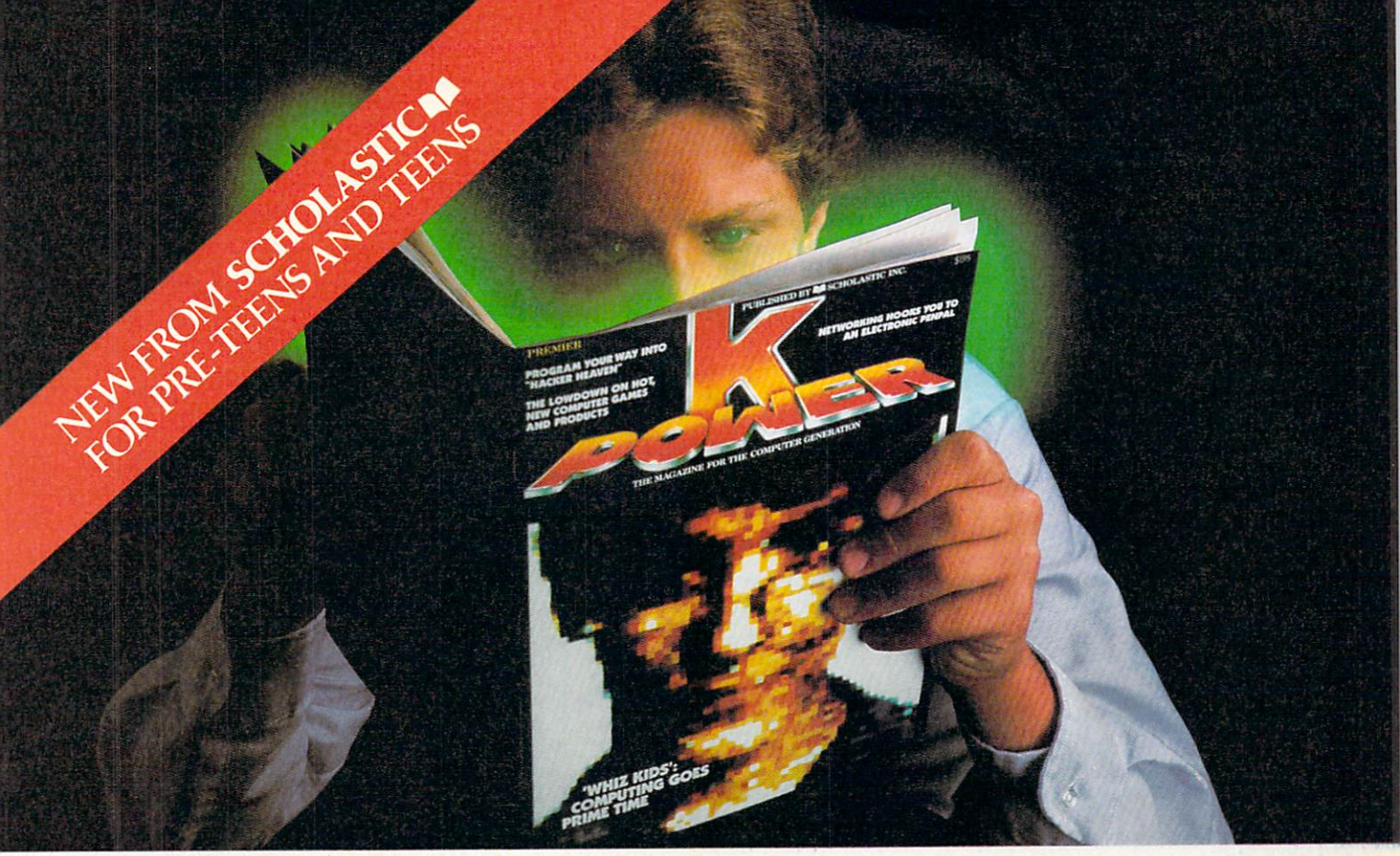
```
440 IF K$ = "Q" THEN TEXT:HOME:END
450 IF K$ = "R" THEN RESTORE:GOTO 20
460 GOTO 430
1000 DATA 6,0,28,0,39,12,29,39,0,39,13,4,4,38,39
1010 DATA 13,3,3,37,39,13,2,2,36,39,13,0,1,35,39
1020 DATA 8,38,38,9,13,8,37,37,10,12,8,14,37,10,11
1030 DATA 8,12,13,10,10,9
2000 DATA 17,8,16,7,17,12,15,13,15,14,15,15,16,13
2010 DATA 14,13,13,14,12,15,11,16,11,9,13,8,12,7
2020 DATA 13,6,14,9,11,9,10,8,9,7,8,6,9,5,10,3,10
2030 DATA 5,12,4,11,6,7,5,6,11,11,12,11,13,10,14,9
3000 DATA 15,8,16,8,17,7,12,9,11,8,10,7,9,6,9,8,12
3010 DATA 7,11,6,13,6,12,5,11,4,12,3,13,3,14,7,35,4
3020 DATA 13,37,15,17,38,13,4,39,2,11,36,8,5,38,16
3030 DATA 12,36,5,7,35,6,15,37,17,8,35,7,18,39,12
3040 DATA 12,36,10,5,39,8,10,36,9,14,37
```

Atari/*Falling Again*

```
10 DIM C(16),R(16),B(16)
20 OPEN #1,4,0,"K:"
30 PRINT CHR$(125);
40 GRAPHICS 5
50 SETCOLOR 0,3,1
60 SETCOLOR 1,13,14
70 SETCOLOR 2,12,6
80 SETCOLOR 4,9,5
89 REM --DRAW IN LARGE, REGULAR AREAS OF PICTURE--
90 FOR X=1 TO 11
100 READ K0,R1,R2,C1,C2
110 COLOR K0
120 FOR Y=R2 TO R1 STEP -1
130 PLOT C1,Y
140 DRAWTO C2,Y
150 NEXT Y
160 NEXT X
169 REM --DRAW BRANCHES OF TREE--
170 FOR X=1 TO 64
180 READ BC,BR
190 PLOT BC,BR
200 NEXT X
210 COLOR 3
219 REM --DRAW LEAVES--
220 FOR X=1 TO 15
230 READ I,K,M
240 C(X)=I
250 R(X)=K
260 B(X)=M
270 PLOT C(X),R(X)
280 NEXT X
290 COLOR 2
299 REM --MAKE THE LEAVES FALL--
300 FOR X=1 TO 15
310 PLOT C(X),R(X)
320 FOR T=1 TO RND(0)*800+1
330 NEXT T
340 COLOR 0
350 PLOT C(X),R(X)
360 FOR Y=R(X)+1 TO B(X)-1
370 LOCATE C(X),Y,HK
380 COLOR 2
390 PLOT C(X),Y
400 FOR T=1 TO 10+RND(0)*70
410 NEXT T
420 COLOR HK
430 PLOT C(X),Y
440 NEXT Y
450 COLOR 2
460 PLOT C(X),B(X)
470 NEXT X
479 REM --PAUSE; THEN PRINT CLOSING MESSAGE--
480 FOR T=1 TO 800
490 NEXT T
499 REM --CLEAR CURSOR--
500 POKE 752,1
510 PRINT
520 PRINT "PRESS <R> FOR AN INSTANT REPLAY"
530 PRINT "OR <Q> TO QUIT."
539 REM --WHEN KEY IS PRESSED, STOP OR START OVER--
540 GET #1,R
550 IF R=81 THEN GRAPHICS 0:END
560 IF R=82 THEN RESTORE :GOTO 30
570 GOTO 540
1000 DATA 3,31,39,0,79,2,0,1,68,79,2,2,3,70,79
1010 DATA 2,4,5,72,79,2,6,7,74,79,2,8,9,76,79
1020 DATA 2,10,11,78,79,1,35,36,22,30,1,34,34
1030 DATA 24,28,1,13,33,24,27,1,9,12,24,25
2000 DATA 16,8,16,10,16,11,17,1,17,7,17,9
2010 DATA 18,2,18,6,18,9,18,14,19,2,19,4,19,5,19,9
2020 DATA 19,13,20,3,20,5,20,8,20,12,21,3,21,5,21,7
2030 DATA 21,9,21,12,22,2,22,6,22,10,22,12,23,3,23,7
2040 DATA 23,11,23,12,24,3,24,6,24,8,25,4,25,5,26,5
2050 DATA 26,9,27,4,27,6,27,8,27,14,28,3,28,7,28,9
2060 DATA 28,13,29,2,29,6,29,10,29,12,30,5,30,11,30
2070 DATA 13,31,4,31,6,31,10,31,14,32,4,32,7,32,11
2080 DATA 33,3,33,7,33,12
3000 DATA 15,11,33,33,8,37,18,15,32,20,9,38,22,1,39
3010 DATA 31,15,35,15,8,37,34,12,39,34,2,33,16,1,36
3020 DATA 31,4,37,27,7,37,29,13,34,28,10,32,29,3,39
```

Commodore 64/*Falling Again*

```
10 DIM R(15),C(15),B(15)
20 SB=1024
30 CB=55296
39 REM --SET SCREEN COLOR--
40 POKE 53281,6
49 REM --SET BORDER COLOR--
50 POKE 53280,11
60 PRINT CHR$(147);
69 REM --DRAW IN LARGE, REGULAR AREAS OF PICTURE--
70 FOR X=1 TO 8
80 READ K0,R1,R2,C1,C2
90 FOR Y=R2 TO R1 STEP -1
100 FOR Z=C2 TO C1 STEP -1
110 POKE CB+Z+40*Y,K0
120 POKE SB+Z+40*Y,160
130 NEXT Z,Y,X
139 REM --DRAW IN BRANCHES OF TREE--
140 FOR X=1 TO 34
150 READ BC,BR
160 POKE CB+BC+40*BR,9
170 POKE SB+BC+40*BR,160
180 NEXT X
189 REM --DRAW LEAVES--
190 FOR X=1 TO 15
200 READ C(X),R(X),B(X)
210 POKE CB+C(X)+40*R(X),5
220 POKE SB+C(X)+40*R(X),160
230 NEXT X
239 REM --MAKE THE LEAVES FALL--
240 FOR X=1 TO 15
250 POKE CB+C(X)+40*R(X),7
260 FOR T=1 TO RND(0)*800+1
270 NEXT T
280 POKE CB+C(X)+40*R(X),6
290 FOR Y=R(X)+1 TO B(X)-1
300 HK=PEEK(CB+C(X)+40*Y)
310 HS=PEEK(SB+C(X)+40*Y)
320 POKE CB+C(X)+40*Y,7
330 POKE SB+C(X)+40*Y,160
340 FOR T=1 TO 10+RND(0)*70
350 NEXT T
360 POKE CB+C(X)+40*Y,HK
370 POKE SB+C(X)+40*Y,HS
380 NEXT Y
390 POKE CB+C(X)+40*B(X),7
400 NEXT X
409 REM --PAUSE--
410 FOR T=1 TO 2000
420 NEXT T
429 REM --SET PRINT POSITION--
```



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```
430 POKE 214,12
440 PRINT
449 REM --PRINT CLOSING MESSAGE--
450 PRINT TAB(15);CHR$(5);"PRESS <R> FOR AN INSTANT"
460 PRINT TAB(17);"REPLAY OR <Q> TO QUIT."
469 REM --WHEN KEY IS PRESSED, STOP OR START OVER--
470 GET K$
480 IF K$="Q" THEN PRINT CHR$(147);:END
490 IF K$="R" THEN RESTORE:GOTO 60
500 GOTO 470
1000 DATA 5,20,24,0,39,7,0,1,35,39,7,2,2,36,39
1010 DATA 7,3,3,37,39,7,4,4,38,39,9,22,22,10,12
1020 DATA 9,23,23,9,13,9,8,21,10,11
2000 DATA 10,7,10,6,10,5,10,4,9,7,8,8,12,7,13,8
2010 DATA 13,6,11,5,9,5,8,5,7,4,6,5,5,6,12,4,14,5
2020 DATA 15,6,8,3,6,3,5,2,4,3,11,3,13,3,14,3,15
2030 DATA 2,16,3,17,4,16,1,14,1,10,2,11,1,8,2,7,1
3000 DATA 13,0,22,11,6,24,16,7,21,17,2,24,12,2
3010 DATA 21,3,4,23,6,1,24,7,6,23,8,9,21,9,1,22
3020 DATA 15,4,23,18,5,20,4,7,21,14,9,20,9,4,20
```

IBM PC w/Color Graphics Adapter & IBM PC*jr*/*Falling Again*

```
10 DIM R(15),C(15),B(15)
20 KEY OFF
30 WIDTH 40
40 SCREEN 0,1
50 LOCATE ,,0
60 COLOR ,2
70 CLS
79 REM --DRAW IN LARGE, REGULAR AREAS OF PICTURE--
80 FOR X=1 TO 10
90 READ K0,R1,R2,C1,C2
100 COLOR K0
110 FOR Y=R1 TO R2
120 LOCATE Y,C1
130 PRINT STRING$(C2-C1,219);
140 NEXT Y,X
149 REM --DRAW BRANCHES OF TREE--
150 FOR X=1 TO 34
160 READ BR,BC
170 LOCATE BR,BC
180 PRINT CHR$(219)
190 NEXT X
199 REM --DRAW LEAVES--
200 COLOR 2
210 FOR I=1 TO 15
220 READ R(I),C(I),B(I)
230 LOCATE C(I),R(I)
240 PRINT CHR$(219)
250 NEXT I
259 REM --MAKE THE LEAVES FALL--
260 COLOR 14
270 FOR X=1 TO 15
280 LOCATE C(X),R(X)
290 PRINT CHR$(219)
300 FOR T=1 TO RND*1000+1
310 NEXT T
320 COLOR 1
330 LOCATE C(X),R(X)
340 PRINT CHR$(219)
350 FOR Y=C(X)+1 TO B(X)-1
360 HK=SCREEN(Y,R(X),1) MOD 16
370 COLOR 14
380 LOCATE Y,R(X)
390 PRINT CHR$(219)
400 FOR T=1 TO RND*70+20
410 NEXT T
420 COLOR,HK
430 LOCATE Y,R(X)
440 PRINT CHR$(219)
450 NEXT Y
460 COLOR 14
470 LOCATE B(X),R(X)
480 PRINT CHR$(219)
490 NEXT X
499 REM --PAUSE; THEN PRINT CLOSING MESSAGE--
500 FOR D=1 TO 3000
510 NEXT D
520 COLOR 0,1
530 LOCATE 14,16
540 PRINT "PRESS <R> FOR AN INSTANT"
550 LOCATE 15,16
560 PRINT "REPLAY OR <Q> TO QUIT."
569 REM --WHEN KEY IS PRESSED, STOP OR START OVER--
570 K$=INKEY$
580 IF K$="Q" THEN COLOR 7,0:CLS:END
590 IF K$="R" THEN RESTORE:GOTO 60 ELSE 570
1000 DATA 1,1,16,1,41,2,17,23,1,41,14,4,4,39,41
1010 DATA 14,3,3,38,41,14,2,2,37,41,14,1,1,36,41
1020 DATA 6,22,22,9,15,6,21,21,11,14,6,8,20,12,13
1030 DATA 6,9,20,13,14
2000 DATA 9,11,8,11,7,11,6,11,9,10,10,9,9,13,10,14,8
2010 DATA 14,7,12,7,10,7,9,6,8,7,7,8,6,6,13,7,15,8
2020 DATA 16,5,9,5,7,6,4,5,5,5,12,5,14,5,15,4,16
2030 DATA 5,17,6,18,3,17,3,15,4,11,3,12,4,9,3,8
2040 DATA 14,3,21,11,7,22,17,9,19,15,11,22,12,2,23
3000 DATA 6,5,20,7,3,22,7,9,19,9,11,19,9,2,22
3010 DATA 17,4,21,18,6,22,5,7,23,14,7,23,10,4,20
```

TI-99/4A/*Falling Again*

```
10 DIM R(15),C(15),B(15)
20 A$="FFFFFFFFFFFFFFFF"
30 CALL CHAR(120,A$)
40 CALL CHAR(128,A$)
50 CALL CHAR(136,A$)
60 CALL CHAR(144,A$)
70 CALL CHAR(152,A$)
80 CALL COLOR(12,11,11)
90 CALL COLOR(13,4,4)
100 CALL COLOR(14,7,7)
110 CALL COLOR(15,13,13)
120 CALL COLOR(16,6,6)
130 CALL CLEAR
140 CALL SCREEN(6)
149 REM --DRAW IN LARGE, REGULAR AREAS OF PICTURE--
150 FOR X=1 TO 9
160 READ K0,R1,R2,C1,C2
170 FOR Y=R2 TO R1 STEP -1
180 FOR Z=C2 TO C1 STEP -1
190 CALL HCHAR(Y,Z,K0)
200 NEXT Z
210 NEXT Y
220 NEXT X
229 REM --DRAW BRANCHES OF TREE--
230 FOR X=1 TO 28
240 READ BR,BC
250 CALL HCHAR(BR,BC,136)
260 NEXT X
269 REM --MAKE THE LEAVES FALL--
270 FOR X=1 TO 15
280 READ R(X),C(X),B(X)
290 CALL HCHAR(R(X),C(X),144)
300 NEXT X
310 FOR X=1 TO 15
320 CALL HCHAR(R(X),C(X),120)
330 FOR T=1 TO RND*400+1
340 NEXT T
350 CALL HCHAR(R(X),C(X),152)
360 FOR Y=R(X)+1 TO B(X)-1
370 CALL GCHAR(Y,C(X),HK)
380 CALL HCHAR(Y,C(X),120)
390 FOR T=1 TO RND*30+10
400 NEXT T
410 CALL HCHAR(Y,C(X),HK)
420 NEXT Y
430 CALL HCHAR(B(X),C(X),120)
440 NEXT X
449 REM --PAUSE; THEN PRINT CLOSING MESSAGE--
450 FOR T=1 TO 1500
460 NEXT T
470 R0=15
```

```
480 FOR X=1 TO 3
490 READ I$
500 FOR WC=1 TO LEN(I$)
510 CALL HCHAR(RO,WC+13,ASC(SEG$(I$,WC,1)))
520 NEXT WC
530 RO=RO+1
540 NEXT X
549 REM --WHEN KEY IS PRESSED, STOP OR START OVER--
550 CALL KEY(3,K,P)
560 IF K<>81 THEN 590
570 CALL CLEAR
580 END
590 IF K<>82 THEN 550
600 RESTORE
610 GOTO 130
1000 DATA 128,19,24,1,32,120,1,2,27,32,120,3,3,28,32
1010 DATA 120,4,4,29,32,120,5,5,30,32,120,6,6,31,32
1020 DATA 136,22,22,6,10,136,21,21,7,9,136,10,20,7,8
2000 DATA 9,7,8,6,9,5,10,4,7,7,6,6,9,9,10,10,11,11
2010 DATA 8,10,7,11,8,12,7,9,6,12,5,11,6,8,5,7,8,4
2020 DATA 7,3,6,4,5,3,4,10,3,11,3,9,4,8,3,7,4,6,3,5
3000 DATA 11,4,19,12,12,21,8,8,23,8,3,21,7,10,21,2
3010 DATA 7,24,5,5,22,4,2,22,5,13,22,3,9,24,9,11,19
3020 DATA 5,13,20,5,9,20,2,4,23,2,12,23
4000 DATA PRESS <R> FOR AN,INSTANT REPLAY
4010 DATA OR <Q> TO QUIT.
```

Timex Sinclair 1000 w/16K RAM Pack & Timex Sinclair 1500/*Falling Again*

```
10 DIM R(11,3)
20 DIM T(5)
30 LET SCRN=PEEK 16396+256*PEEK 16397
40 FAST
49 REM --DRAW IN LARGE, REGULAR AREAS OF PICTURE--
50 LET D$="16,21,0,31,134,7,19,6,7,128,0,1,26,31,136,2
,2,27,31,136,3,3,28,31,136,"
60 LET P1=1
70 LET P2=1
80 FOR X=1 TO 5
90 FOR Y=1 TO 5
100 GOSUB 1000
110 LET T(Y)=VAL N$
120 NEXT Y
130 FOR Z=T(1) TO T(2)
140 FOR R=T(3) TO T(4)
150 PRINT AT Z,R;CHR$ T(5)
160 NEXT R
170 NEXT Z
180 NEXT X
189 REM --DRAW BRANCHES OF TREE--
190 LET D$="1,4,1,9,2,1,2,5,2,6,2,8,2,11,2,12,3,2,3,4,
3,9,3,11,4,3,4,6,4,10,4,12,5,4,5,7,5,9,6,3,6,5,6,6,6,8
,6,10,"
200 LET P1=1
210 LET P2=1
220 FOR X=1 TO 24
230 GOSUB 1000
240 LET A=VAL N$
250 GOSUB 1000
260 PRINT AT A,VAL N$;CHR$ 128
270 NEXT X
280 SLOW
289 REM --DRAW LEAVES--
290 LET D$="0,8,20,1,6,20,1,10,17,1,12,21,2,4,19,2,9,1
9,4,2,18,4,5,18,4,7,21,6,11,19,7,3,16,"
300 LET P1=1
310 LET P2=1
320 FOR X=1 TO 11
330 FOR Y=1 TO 3
340 GOSUB 1000
350 LET R(X,Y)=VAL N$
360 NEXT Y
370 PRINT AT R(X,1),R(X,2);CHR$ 136
380 NEXT X
389 REM --MAKE THE LEAVES FALL--
390 FOR X=1 TO 11
400 PRINT AT R(X,1),R(X,2);" "
410 FOR Y=R(X,1)+1 TO R(X,3)-1
420 LET PK=PEEK (SCRN+R(X,2)+Y*33+1)
430 PRINT AT Y,R(X,2);CHR$ 136
440 PRINT AT Y,R(X,2);CHR$ PK
450 NEXT Y
460 PRINT AT R(X,3),R(X,2);CHR$ 136
470 NEXT X
479 REM --PAUSE, THEN PRINT CLOSING MESSAGE--
480 PAUSE 120
490 PRINT AT 18,14;"PRESS <R> FOR AN"
500 PRINT AT 19,14;"INSTANT REPLAY"
510 PRINT AT 20,14;"OR <Q> TO QUIT."
520 LET K$=INKEY$
530 IF K$="Q" THEN GOTO 570
540 IF K$<>"R" THEN GOTO 520
550 CLS
560 GOTO 40
570 CLS
580 STOP
999 REM --SIMULATE READ/DATA STATEMENTS--
1000 IF D$(P1)="," THEN GOTO 1030
1010 LET P1=P1+1
1020 GOTO 1000
1030 LET N$=D$(P2 TO P1-1)
1040 LET P1=P1+1
1050 LET P2=P1
1060 RETURN
```

TRS-80 Color Computer/*Falling Again*

```
10 DIM R(13),C(13),B(13)
20 CLS(0)
29 REM --DRAW IN LARGE, REGULAR AREAS OF PICTURE--
30 FOR X=1 TO 8
40 READ KO,R1,R2,C1,C2
50 FOR Y=R2 TO R1 STEP -1
60 FOR Z=C2 TO C1 STEP -1
70 PRINT@Z+32*Y,CHR$(143+KO);
80 NEXT Z,Y,X
89 REM --DRAW BRANCHES OF TREE--
90 FOR X=1 TO 21
100 READ BC,BR
110 PRINT@BC+32*BR,CHR$(128);
120 NEXT X
129 REM --DRAW LEAVES--
130 FOR X=1 TO 13
140 READ C(X),R(X),B(X)
150 PRINT@C(X)+32*R(X),CHR$(143);
160 NEXT X
169 REM --MAKE THE LEAVES FALL--
170 FOR X=1 TO 13
180 PRINT@C(X)+32*R(X),CHR$(143+16);
190 FOR T=1 TO RND(800)
200 NEXT T
210 PRINT@C(X)+32*R(X),CHR$(143+32);
220 FOR Y=R(X)+1 TO B(X)-1
230 HK=PEEK(1024+C(X)+32*Y)
240 PRINT@C(X)+32*Y,CHR$(143+16);
250 FOR T=1 TO 10+RND(100)
260 NEXT T
270 PRINT@C(X)+32*Y,CHR$(HK);
280 NEXT Y
290 PRINT@C(X)+32*B(X),CHR$(143+16);
300 NEXT X
309 REM --PAUSE; THEN PRINT CLOSING MESSAGE--
310 FOR T=1 TO 2000
320 NEXT T
330 PRINT@431,"PRESS <R> TO SEE";
340 PRINT@463,"AN INSTANT REPLAY";
350 PRINT@495,"OR <Q> TO QUIT.";
359 REM --WHEN KEY IS PRESSED, STOP OR START OVER--
360 K$=INKEY$
370 IF K$="Q" THEN CLS:END
380 IF K$="R" THEN RESTORE:GOTO 20 ELSE 360
1000 DATA 0,11,15,0,31,32,0,10,0,31,16,0,1,28,31
1010 DATA 16,2,2,29,31,16,3,3,30,31,-15,13,13,6,10
```

```
1020 DATA -15,12,12,7,9,-15,5,11,7,8
2000 DATA 5,5,6,4,7,4,9,4,2,4,3,3,5,3,7,3,10,3,11,3
2010 DATA 12,2,4,2,8,2,2,2,1,1,5,1,6,1,9,1,11,1
2020 DATA 13,1,7,0
3000 DATA 13,3,11,8,3,14,2,1,14,5,6,12,0,2,13,14,1
3010 DATA 12,6,2,14,1,5,12,4,0,15,10,4,12,11,2,14
3020 DATA 4,4,13,10,0,15
```

TRS-80 Model III/*Falling Again*

```
10 CLEAR 100
20 DIM R(14),C(14),B(14)
30 SB=15360
40 CLS
49 REM --DRAW IN LARGE, REGULAR AREAS OF PICTURE--
50 PRINT@704,STRING$(64,131);
60 FOR X=1 TO 4
70 READ R1,R2,C1,C2
80 FOR Y=R2 TO R1 STEP -1
90 FOR Z=C2 TO C1 STEP -1
100 PRINT@Z+64*Y,CHR$(191);
110 NEXT Z,Y,X
119 REM --DRAW BRANCHES OF TREE--
120 FOR X=1 TO 84
130 READ LO,CH
140 PRINT@LO,CHR$(CH);
150 NEXT X
159 REM --DRAW LEAVES--
160 FOR X=1 TO 14
170 READ R(X),C(X),B(X)
180 POKE SB+C(X)+64*R(X),194
190 NEXT X
199 REM --MAKE THE LEAVES FALL--
200 FOR X=1 TO 14
210 FOR T=1 TO RND(800)
220 NEXT T
230 POKE SB+C(X)+64*R(X),128
240 FOR Y=R(X)+1 TO B(X)-1
250 HK=PEEK(SB+C(X)+64*Y)
260 POKE SB+C(X)+64*Y,194
270 FOR T=1 TO 10+RND(70)
280 NEXT T
290 POKE SB+C(X)+64*Y,HK
300 NEXT Y
310 POKE SB+C(X)+64*B(X),194
320 NEXT X
329 REM --PAUSE; THEN PRINT CLOSING MESSAGE--
330 FOR T=1 TO 2000
340 NEXT T
350 PRINT@867,"PRESS <R> FOR AN INSTANT";
360 PRINT@931,"REPLAY OR <Q> TO QUIT.";
369 REM --WHEN KEY IS PRESSED, STOP OR START OVER--
370 K$=INKEY$
380 IF K$="Q" THEN CLS:END
390 IF K$="R" THEN RESTORE:GOTO 40 ELSE 370
1000 DATA 0,0,53,63,1,1,54,63,2,2,59,63,6,13,16,19
2000 DATA 117,139,183,131,184,139,185,143,186,143,783
2010 DATA 168,846,176,847,190,788,144,852,191,853,180
2020 DATA 854,144,393,131,330,152,331,131,332,181,333
2030 DATA 191,334,129,335,138,336,191,337,180,339,191
2040 DATA 340,159,342,141,345,130,346,131,347,131,262
2050 DATA 152,263,131,265,136,266,176,270,186,271,141
2060 DATA 272,188,273,144,274,130,275,191,276,170,277
2070 DATA 131,278,189,280,171,281,177,283,160,284,176
2080 DATA 285,135,200,152,201,137,202,176,203,153,204
2090 DATA 131,205,141,206,176,207,132,209,152,210,171
2100 DATA 211,149,213,170,214,140,215,166,217,160,218
2110 DATA 134,136,164,140,170,141,181,142,176,143,156
2120 DATA 144,135,147,191,148,129,150,152,152,154,75
2130 DATA 137,76,144,77,160
3000 DATA 78,134,83,130,84,164,85,152,86,131,88,160
3010 DATA 89,152,10,160,19,144,23,176,4,12,12,0,24
3020 DATA 13,4,30,14,2,7,14,5,28,13,5,6,12,6,8,13,6
3030 DATA 14,12,5,23,12,3,27,14,1,15,14,1,26,15,2,21
3040 DATA 14,0,11,15
```


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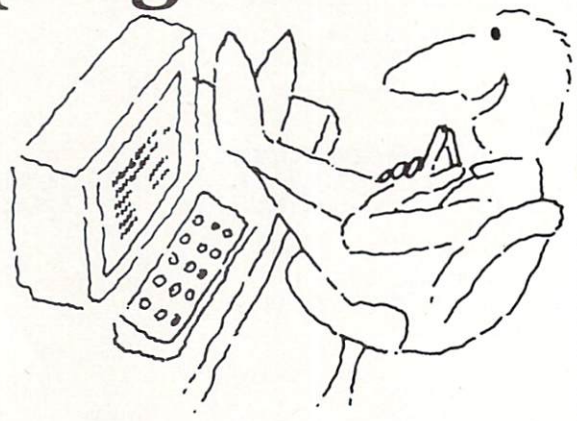

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VIC-20/*Falling Again*

```
10 DIM R(15),C(15),B(15)
20 SB=7680
30 CB=38400
39 REM --SET SCREEN AND BORDER COLOR--
40 POKE 36879,25
50 PRINT CHR$(147);
59 REM --DRAW IN LARGE, REGULAR AREAS OF PICTURE--
60 FOR X=1 TO 9
70 READ KO,R1,R2,C1,C2
80 FOR Y=R2 TO R1 STEP -1
90 FOR Z=C2 TO C1 STEP -1
100 POKE CB+Z+22*Y,KO
110 POKE SB+Z+22*Y,160
120 NEXT Z,Y,X
129 REM --DRAW IN BRANCHES OF TREE--
130 FOR X=1 TO 23
140 READ BC,BR
150 POKE CB+BC+22*BR,9
160 POKE SB+BC+22*BR,160
170 NEXT X
179 REM --DRAW LEAVES--
180 FOR X=1 TO 15
190 READ C(X),R(X),B(X)
200 POKE CB+C(X)+22*R(X),5
210 POKE SB+C(X)+22*R(X),160
220 NEXT X
229 REM --MAKE THE LEAVES FALL--
230 FOR X=1 TO 15
240 POKE CB+C(X)+22*R(X),7
250 FOR T=1 TO RND(0)*800+1
260 NEXT T
270 POKE CB+C(X)+22*R(X),6
280 FOR Y=R(X)+1 TO B(X)-1
290 HK=PEEK(CB+C(X)+22*Y)
300 HS=PEEK(SB+C(X)+22*Y)
310 POKE CB+C(X)+22*Y,7
320 POKE SB+C(X)+22*Y,160
330 FOR T=1 TO 10+RND(0)*70
340 NEXT T
350 POKE CB+C(X)+22*Y,HK
360 POKE SB+C(X)+22*Y,HS
370 NEXT Y
380 POKE CB+C(X)+22*B(X),7
390 NEXT X
399 REM --PAUSE--
400 FOR T=1 TO 2000
410 NEXT T
419 REM --SET PRINT POSITION--
420 POKE 214,10
430 PRINT
439 REM --PRINT CLOSING MESSAGE--
440 PRINT TAB(8);"PRESS <R> FOR"
450 PRINT TAB(10);"AN INSTANT"
460 PRINT TAB(8);"REPLAY OR <Q>"
470 PRINT TAB(11);"TO QUIT."
479 REM --WHEN KEY IS PRESSED, STOP OR START OVER--
480 GET K$
490 IF K$="Q" THEN PRINT CHR$(147);:END
500 IF K$="R" THEN RESTORE:GOTO 50
510 GOTO 480
1000 DATA 5,17,22,0,21,6,0,16,0,21,7,0,1,17,21,7,2
1010 DATA 2,18,21,7,3,3,19,21,7,4,4,20,21,0,20,20
1020 DATA 4,8,0,19,19,5,7,0,6,18,5,6
2000 DATA 5,5,4,5,3,6,2,7,7,5,8,4,9,5,10,6,11,5,6
2010 DATA 4,3,4,2,3,1,4,1,2,7,3,5,3,4,2,3,1,6,2,7
2020 DATA 1,9,1,10,2,9,3
3000 DATA 0,1,17,1,5,19,2,0,22,2,8,18,3,2,20,4,4,19
3010 DATA 5,1,22,6,3,21,7,6,18,8,0,21,8,2,19,9,4,20
3020 DATA 10,0,21,11,2,22,11,7,18,12,5,19
```

SOLUTION TO LAST MONTH'S PUZZLE:

Mr. Harry Winkler was abducted by the Outer People while watching the 1969 moon walk on television. (His flavor association refers to the orange drink, Tang, which the astronauts drank on the journey.) Mr. Winkler's less recent memory is of a toothpaste commercial.

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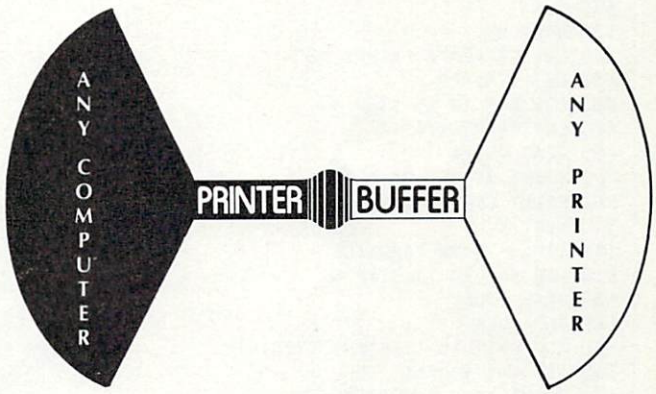

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```
119 REM -- START INPUT LOOP --
120 FOR X=1 TO 3
130 READ T$,V$
140 IF X>1 THEN CLS
150 PRINT "WHAT ";T$;" DOES YOUR FATHER"
160 PRINT V$;"?"
170 PRINT
180 PRINT "(10 LETTERS OR FEWER, PLEASE.)"
190 PRINT
200 PRINT "HE ";V$(1 TO 4);"S ";V$(6 TO );
210 INPUT F$
220 IF LEN F$>10 THEN GO TO 170
230 LET C$(X)=F$
240 LET C$(X,11 TO 12)=STR$ LEN F$
249 REM -- RATE DAD --
250 CLS
260 PRINT "ON A SCALE OF 1 TO 10,"
270 PRINT "HOW GOOD IS YOUR DAD AT"
280 PRINT V$(6 TO );" ";C$(X,1 TO VAL C$(X,11 TO 12));
"?"
290 INPUT S(X)
300 IF S(X)<1 OR S(X)>10 THEN GO TO 250
310 NEXT X
319 REM -- END OF INPUT LOOP --
320 CLS
330 PRINT "PRESS <ENTER>, THEN GET YOUR","DAD."
340 LET R$=INKEY$
350 IF R$<>CHR$ 13 THEN GO TO 340
360 CLS
370 PRINT "HI DAD!"
380 PRINT "PRESS <ENTER> TO SEE"
390 PRINT "HOW GOOD YOU ARE AT ..."
400 LET R$=INKEY$
410 IF R$<>CHR$ 13 THEN GO TO 400
419 REM -- PRINT LABELS --
420 CLS
430 RESTORE
440 LET C$(4)="A FATHER  8"
450 LET S(4)=20
460 FOR X=1 TO 13 STEP 4
470 LET Q=INT(X/4)+1
480 READ T$,V$
490 PRINT AT X,0;V$(6 TO )
500 PRINT C$(Q, TO VAL C$(Q,11 TO 12))
510 NEXT X
519 REM -- DRAW GRAPHICS --
520 FOR X=1 TO 13 STEP 4
530 READ COLR
540 INK COLR
550 FOR C=11 TO 11+S(INT (X/4)+1)
560 FOR R=X TO X+1
570 PRINT AT R,C;CHR$ 143;
580 NEXT R
590 NEXT C
600 NEXT X
610 INK 0
620 PRINT AT 17,7;"HAPPY FATHER'S DAY!"
630 PRINT AT 19,25-LEN N$;"LOVE, ";N$
640 LET R$=INKEY$
650 IF R$="" THEN GO TO 640
660 STOP
1000 DATA "SPORT","LIKE PLAYING"
1010 DATA "CHORE","HATE DOING"
1020 DATA "GAME","LIKE PLAYING"
1030 DATA "NULL","NULL BEING"
1040 DATA 4,3,6,2
```

Timex Sinclair 1000 w/16K RAM Pack & Timex Sinclair 1500/*Phone Cost Monitor* *(May, page 70)*
You must add two lines and change a third in order to make this program work correctly. Add lines 60 and 65:

```
60 LET TM=0
65 LET SP=0
```

Then change AA to AT in line 770:

```
770 IF SEC>0 AND FL=0 AND MIN>=BG THEN LET CO=CO+AT
```

. . . AND ENHANCEMENTS

Once you've typed in and enjoyed one or more of our programs, we hope you'll try experimenting with them (remember, nothing you type in can harm your computer!). It's a great way to learn more about programming, and in the process, you might produce a version that you like even more.

Many of our readers have sent us success stories. One reader added sound to make a game more enjoyable. Another suggested slowing down a game so her 83-year-old mother could play it. We'll publish the best of these changes in this column.

We also encourage you to try translating our programs for other computers—especially the reader-written programs, which appear each month for only one computer. If you're willing, we'll publish your name and address here so that other owners of your brand of computer can write you (with a stamped, self-addressed envelope, of course) for copies of your translation.

ADAM/*Disk Label Maker* *(June, page 74)*
Clevelander Larry Taylor writes, "I ran the *Disk Label Maker* and by adding the following lines was able to make it print two labels, side by side, in order to get twice as many labels on a page. Also, I can instruct the ADAM to print as many copies as I designate." Larry changed lines 330–380 to read

```
330 FOR k=1 to c
340 PRINT "*-*-*-
```

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PUTTING BABY TO SLEEP With a Commodore 64

BY PEGGY HERRINGTON

PHOTOGRAPH BY DALE HANKIN

Pamela, lulled to sleep by her computerized teddy bear.

The trouble started just before our daughter, Pamela, turned one. Up to then she had been a model baby—all dimples and wet kisses.

PEGGY HERRINGTON *is a freelance writer and mother of two. She is currently writing a book called "1,000 Years Of Music On Your Commodore 64." She lives in Albuquerque, New Mexico, and is an active member of The New Mexico Commodore Users' Group.*

And then, suddenly, she changed to a screaming dervish when left alone to settle down for the night in her toy-filled crib.

Bedtime became unbearable for her, her father, and me. My husband and I would let her kiss just about everything in the house good night. We would let her feed the fish, switch on the night light and switch off the overhead, and then lingeringly hug and kiss the two of us while we put her in the crib. We'd wind up her pink, musical teddy bear and slip from the room as she snuggled in.

Moments later—like clockwork—it would happen. The teddy bear would wind down before Pamela fell asleep and she would begin to cry. My husband and I would take turns going back into her room to rewind that darned bear—again, and again, and again. Seven to 10 trips later, Pamela would finally doze off. It seemed like a million trips.

We tried everything. We let her cry it out but she outlasted both of us. We bought longer-playing stuffed animals, musical mobiles that dangled overhead, and horses and trains that rocked gently along the rail of her crib. Nothing worked. Pamela continued to howl if her old pink teddy bear wasn't singing away at her side.

And then it struck me: Why not write a musical teddy bear program that would play endlessly on our recently purchased Commodore 64?

HOW MY PROGRAM WORKS

After you type in *Teddy's Song* and RUN it, a picture of a teddy bear will appear on the screen along with the sound of a winding key. Brahms' "Cradle Song" will start to play and soon the teddy bear will yawn and close his eyes and fall asleep. He will wake again when the music stops and the sound of the winding key begins. The music will start up, and the cycle will repeat itself until you press the RUN/STOP and RESTORE keys.

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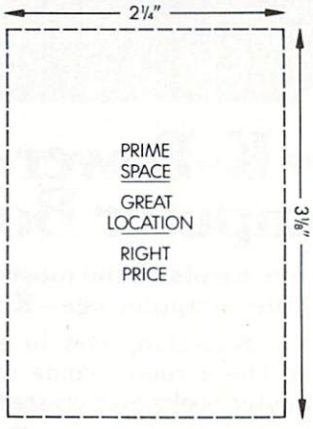

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I wish I could report that *Teddy's Song* solved our bedtime problem. Unfortunately, by the time the program was finished Pamela had graduated to another bedtime need: stories. I haven't been able to figure out how to get the computer to cuddle up with her in the recliner. But I'm working on it.

Commodore 64/*Teddy's Song*

```
10 DIM N%(53),D%(53):S=54272:V=53248:C=0
20 FOR I=0 TO 24:POKE S+I,0:NEXT I
30 POKE V+32,7:POKE V+33,7
40 PRINT CHR$(147):PRINT:PRINT TAB(13);CHR$(151);"TEDD
Y'S SONG"
50 PRINT TAB(13);CHR$(30);"**********":PRINT
60 PRINT TAB(8);CHR$(28);"MUSIC BY JOHANNES BRAHMS"
70 PRINT TAB(13);"(1833 - 1897)"
80 POKE 214,19:PRINT
90 PRINT TAB(13);CHR$(30);"**********"
100 FOR I=0 TO 53:READ N%(I),D%(I):NEXT I
110 FOR S1=12288 TO 12543:READ Q1:POKE S1,Q1:NEXT S1
120 FOR I=39 TO 42:POKE V+I,9:NEXT I:POKE V+23,15:POKE
 V+29,15
130 FOR I=0 TO 7:READ T:POKE V+I,T:NEXT I
140 POKE 2040,192:POKE 2043,195:POKE V+21,9
150 POKE 1442,81:POKE 55714,0
160 POKE 1444,81:POKE 55716,0
170 POKE 1561,223:POKE 55833,5
180 FOR I=0 TO 2:POKE 1562+I,98:POKE 55834+I,5:NEXT I
190 POKE S+24,15
200 FOR I=1 TO 3
210 FOR J=1 TO 9:POKE S+14,3:POKE S+15,125:POKE S+18,1
29:POKE S+18,128:NEXT J
220 FOR DELAY=1 TO 800:NEXT DELAY:NEXT I
230 WD=INT(RND(0)*15)+39:T=53-WD
240 POKE S+1,N%(C):POKE S+5,11:POKE S+15,N%(C)/2:POKE
S+4,21
250 FOR DELAY=1 TO D%(C)+(T/2.5)*(T/2.5):NEXT DELAY
260 T=T+1:IF T=53 THEN POKE 2040,192:GOTO 200
270 IF T=(53-WD)+7 THEN POKE 2040,193
280 IF T=(53-WD)+15 THEN POKE 2040,194
290 C=C+1:IF C=54 THEN C=0
300 POKE S+4,20:GOTO 240
1000 DATA 142,304,142,304,168,1024,142,304,142
1010 DATA 304,168,1024,142,286,168,286,225,512
1020 DATA 212,768,189,256,189,512,168,512,126,256
1030 DATA 142,256,150,512,126,512,126,256,142,256
1040 DATA 150,1024,126,256,150,256,212,256,189,256
1050 DATA 168,512,212,512,225,1024,112,256,112,256
1060 DATA 225,1024,189,256,150,256,142,256,168,768
1070 DATA 142,256,112,256,150,512,168,512,189,512
1080 DATA 168,1024,112,256,112,256,225,1024,189,256
1090 DATA 150,256,168,1024,142,256,112,288,150,253
1100 DATA 168,256,150,256,142,543,126,543,112,1088
2000 DATA 62,0,124,127,0,254,235,129,215,213,129
2010 DATA 171,235,255,215,127,255,254,31,255,248,12
2020 DATA 126,48,24,60,24,56,60,28,124,126,62,255
2030 DATA 255,255,255,231,255,251,255,223,249,255
2040 DATA 159,252,255,63,126,0,126,63,0,252,31,129
2050 DATA 248,15,255,240,7,255,224,0,62,0,124,127
2060 DATA 0,254,235,129,215,213,129,171,235,255,215
2070 DATA 127,255,254,31,255,248,12,126,48,27,189
2080 DATA 216,127,255,254,243,231,207,236,231,55,223
2090 DATA 255,251,191,195,253,255,129,255,255,0,255
2100 DATA 127,0,254,63,0,252,31,129,248,15,195,240,7
2110 DATA 255,224,0,62,0,124,127,0,254,235,129,215,213
2120 DATA 129,171,235,255,215,127,255,254,63,255,252
2130 DATA 15,255,240,31,255,248,55,219,236,123,189
2140 DATA 222,252,126,63,255,231,255,255,255,255,255
2150 DATA 255,255,255,255,255,126,255,126,63,126,252
2160 DATA 31,129,248,15,255,240,7,255,224,0,31,255
2170 DATA 252,127,255,254,255,255,255,255,255,255
2180 DATA 249,255,159,247,255,239,207,239,243,63,255
2190 DATA 252,127,255,254,255,255,255,255,255,255
2200 DATA 255,255,255,253,255,191,254,126,127,127
2210 DATA 189,254,127,195,254,127,231,254,63,231,252
2220 DATA 63,231,252,127,231,254,127,231,254,0
3000 DATA 156,116,156,116,156,116,156,161
```


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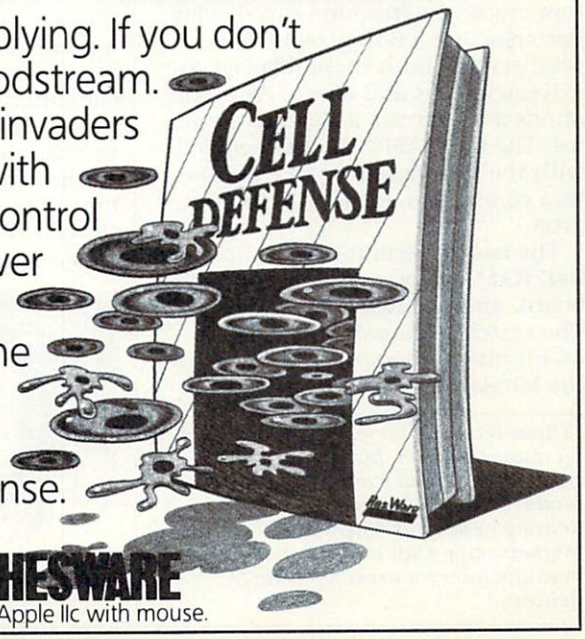

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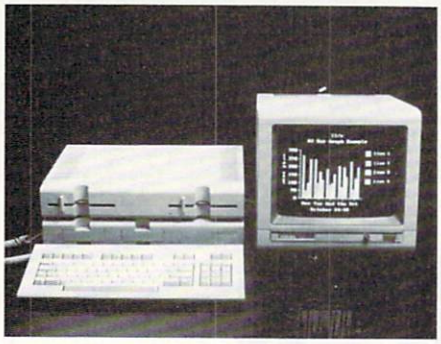
COMPUTERS

Mindset Computer

MANUFACTURER: Mindset Corp., 617 N. Mary, Sunnyvale, CA 94086; (408) 737-8555
PRICE: $1,099–$2,399

Mindset, a new company, is marketing an IBM-compatible computer called the Mindset. It runs most programs written for the IBM PC, including *Lotus 1-2-3*, *WordStar*, and *Multiplan*. What sets this new computer apart from other IBM-compatibles is its superior graphics capabilities.



The Mindset connects to a television, video monitor, or RGB monitor. It can display 16 colors at once, at a resolution of 320 × 200 (the number of dots measured horizontally and vertically). In high-resolution mode, the machine can display two colors on a 640-pixel by 400-pixel screen. Both these displays are extremely clear and sharp. Also, the Mindset can create animated graphics. The GW BASIC that is included with the system has special animation commands, such as START and STOP.

The base system ($1,099) includes 64K RAM, a typewriter-style keyboard, and two ROM cartridge slots. The system is based on the 80186 16-bit microprocessor, which allows the Mindset to run programs faster than the IBM PC.

One or two disk drives (with two drives, storage is 720K) can be added, and the computer's RAM can be expanded to 256K. The fully configured Expansion II unit (two disks and 256K RAM) costs $2,399. Parallel and serial ports are not included, but can be added. Also available is the Mindset Mouse, which can be used as a drawing tool with any of the several advanced-graphics software packages that are available.

**These products have been announced by manufacturers, but are not necessarily in the stores yet. Some products may still be under development, and others may be in test markets only. Call or write the manufacturer for expected date of delivery.*

MONITORS

Sears TV/Monitor

MANUFACTURER: Sears, Roebuck & Co., Dept. 703-BSC 4015, Sears Tower, Chicago, IL 60684; (312) 875-8306
PRICE: $350

Computer users who want to play games in full color and then switch to word processing with an 80-character display, often find themselves switching between a TV and a monochrome monitor. That's because TVs and most color monitors can't display 80 characters across the screen as clearly as monochrome monitors can.

The Sears 4084 Color TV/Monitor solves this problem by offering three different displays in one package. The 4084 functions as a TV, an RGB (Red-Green-Blue) color monitor, and a green-screen monochrome monitor. To use the RGB monitor, your computer must have RGB output, as the IBM PC and PC*jr* do. Otherwise, you can use the TV for color.

While in the RGB mode, at the touch of a switch you can improve the clarity of on-screen material by compressing it to 70 percent of its original height. Both the monochrome monitor and the RGB monitor can also display 25 lines of text at 80 characters each.

As a portable television, the unit has electronic channel selection, is capable of receiving 12 stations, and has the usual color, tint, and vertical hold controls found on a TV.

All connections are on the back of the unit to keep wires out of sight and out of the way. Videocassette recorders, videodisk players, and other accessories can also be connected.

PRINTERS

Axiom Direct-Connect Printers

MANUFACTURER: Axiom Corp., 1014 Griswold Ave., San Fernando, CA 91340; (213) 365-9521
PRICE: $299–$629

Axiom Corp. announces direct-connect printers for Apple, Atari, Commodore, IBM, and TI-99/4A computers. Axiom's line of printers need only be plugged into the computer to work—they require no special interfaces or expansion boxes. Each printer comes with a built-in interface designed for a particular computer and only that computer. Therefore, if a printer comes with an Atari interface, it can only be used with Atari computers. Ditto for printers with an Apple or a TI-99/4A interface. This means that if you buy a new and different computer, you must also buy another printer.

Three different models are offered: the GP-700 for $599–$659, GP-550 for $319–$369, and GP-100 for $299-$309. (The GP-700 is not made in a Commodore version and the GP-700 and GP-100 are not made for the IBM PC.)

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But more importantly, they'll use it to stimulate their imagination and to express their ideas.

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KoalaGrams

Awaken their sense of discovery and watch them learn.

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Koala Technologies Corporation
3100 Patrick Henry Drive
Santa Clara, California 95052-8100

WHAT'S IN STORE
NEW HARDWARE

The GP-700 is a four-color dot-matrix printer that includes both pin- and friction-feed mechanisms, allowing the use of either fanfold or single-sheet paper. It prints either 80 or 106 cpl (characters per line) at a maximum of 50 cps (characters per second). This printer uses a four-color cassette ribbon with automatic color mixing, which allows a variety of color combinations.

For high-speed draft and letter-quality printing, Axiom offers the GP-550. Also a dot-matrix printer, the GP-550 has 18 built-in character sets; 12 of these are "near letter-quality." The GP-550 also has both pin- or friction-feed mechanisms. In draft mode it prints at 86 cps; in near letter-quality mode it prints at 43 cps. The GP-550 prints an 80-, 96-, or 136-character line.

The GP-100 has an adjustable tractor feed. It prints 80 cpl at 30 cps. Like the other models, it is a dot-matrix printer capable of printing graphics.

Olympia Printer/Typewriter

MANUFACTURER: Olympia USA Inc., Box 22, Somerville, NJ 08876-0022; (201) 722-7000
PRICE: $599

Olympia USA, the typewriter manufacturer, has developed a new electronic typewriter that doubles as a computer printer. The Electronic Compact 2 has a Centronics-parallel

interface built in, allowing you to connect it with a cable to the parallel port on your computer.

The Compact 2 prints at 14 characters per second, and has three pitch selections (10, 12, and 15 characters per inch). Its 46-key keyboard includes an ON-LINE key to activate printer operation.

An interface extension module that provides both a parallel and an RS-232C serial interface is an option. The extension also includes a 2K printer buffer capable of storing a page of text or data from the computer.

MISCELLANEOUS

ADAM Peripherals and Accessories

MANUFACTURER: Coleco Industries, 999 Quaker Lane S., West Hartford, CT 06110; (203) 725-6000
ESTIMATED RETAIL PRICE: $175 (Digital Data Drive); $175 (Memory Expander); $400 (Floppy Disk Drive); $300 (Modem); $30 (Accessory Kit).

For ADAM computer owners, Coleco has introduced a series of expansion units, peripherals, and accessories.

A second digital data drive, which can be installed by the user, will be made available. With the new drive and the drive that comes with the ADAM, users can access and store up to 512K of information, or load programs on one drive and store them on another.

Another expansion unit is a plug-in memory expander that increases the memory from 80K to 144K.

New peripherals include a floppy disk drive and a modem. The 5¼-inch disk drive accepts single-sided, double-density floppy disks, and can store up to 160K of data. The disk drive works with the ADAM's built-in word-processing program and the digital data drives. All software made for ADAM can be transferred from digital tape to floppy disk drives, which are likely to be faster and more reliable than the digital data drives.

The ADAMLink Modem, which allows users to send and receive data, is a 300-baud, full-duplex, direct-connect modem.

The ADAM Accessory Kit is a package containing replacement daisy wheels for the printer (three wheels, each with a different type font), a carbon ribbon cartridge, a blank digital data pack, and a tape head-cleaner with applicator.

Cardco Interface (for Commodore)

MANUFACTURER: Cardco, Inc., 313 Mathewson Ave., Wichita, KS 67214; (316) 267-6525
PRICE: $89

Card?/+G, a parallel-printer interface for the VIC-20 and Commodore 64, connects to most standard parallel printers. According to Cardco, neither the computer nor the printers require hardware modifications.

When the Card?/+G interface is connected to a dot-matrix printer, the Commodore 64's full character set may be printed out, including graphics characters, reversed graphics, and reversed alphanumeric characters.

To connect any printer other than a Commodore printer to the VIC-20 or C 64, some type of interface is required.

Key Tronic Keyboard (IBM PC*jr*)

MANUFACTURER: Key Tronic, Department E6, P.O. Box 14687, Spokane, WA 99214; (800) 262-6006
PRICE: $255

Key Tronic, the same company that also manufactures and sells a typewriter-style keyboard for the IBM PC, now sells a keyboard for the PC*jr*. It plugs into the system unit's keyboard outlet, and offers three things that the PC*jr* keyboard doesn't: typewriter-style keys instead of rubber, Chiclet-style keys; alphanumeric markings on the keys instead of on the keyboard housing; and a numeric keypad. The Key Tronic keyboard also has 10 function keys. It comes in the same color as the PC*jr* and matches perfectly with the system components.

However, you can't buy the Key Tronic keyboard instead of the PC*jr* keyboard; it is an option that is sold independently of IBM. FC

Introducing the Batteries Included FAMILY of Computer Products

PaperClip
The finest word processor available for the Commodore 64 now offers the ability to switch from a 40 to an 80 column display without additional hardware. PaperClip's state of the art design allows free movement of columns, phrases, sentences or paragraphs from one location to another within the text. This outstanding addition to your Commodore 64 system is now available with SpellPack.

Home Organizer Series
These programs, which are available individually, are specifically designed modules for your record keeping activities. Programs available include stamps, recipes, addresses, mailing lists, personal banking, music and book libraries, photo and home movie collection and household inventory. Each module is so easy to use even a novice can achieve professional results.

The Consultant
The Consultant, a database management system, is like a computerized filing cabinet with a brain. With it you can design a layout for any kind of information that needs filing, allowing you various methods for searching, sorting and analyzing your data quickly.

BusCard II
An improved version of the original BusCard which allows you to add any Commodore-compatible disk drive, including hard disk, and virtually any printer on the market. Just plug it in and you can mix and match your peripherals without fear of software incompatability.

B.I.-80
Another plug in module that provides an 80 column, crystal clear display. Interference is eliminated even with a full screen of characters. It is readily switched from 40 to 80 column display at anytime and can be used with Commodore 1701 and 1702 color monitor or any monochrome video monitors.

SpellPack
This program contains a dictionary of over 20,000 commonly used words in the English language. SpellPak will check each word, in its context, on the entire document in 2-4 minutes and highlight those not found in the dictionary. You may then correct the spelling if required or instantly add the word to the SpellPack dictionary with a single key command. In this manner the dictionary may be expanded by over 5,000 terms for any technical or scientific vocabulary your work may demand.

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WHAT'S IN STORE
SOFTWARE GUIDE

QUICK TAKES ON SOFTWARE—NEW AND NOTEWORTHY

Welcome to FAMILY COMPUTING's Software Guide, the most comprehensive listing available of two dozen of the newest, most noteworthy, and/or best programs on the market. Our reviewers include families from all over the country who have judged the software according to the following criteria: long-term benefits and applications, adaptability, and advantages of using a computer for a given task. Programs have been evaluated and rated for their performance in each of the categories listed below. More detailed reviews of some programs follow.

Here's a rundown of the ratings categories and what they mean: **O** = Overall performance, given the limitations and capacities of the particular computer for which the software is intended. **D** = Documentation, or the instructions and literature that accompany a program. **EH** = Error-handling, the software's capacity to accommodate errors made by the user—an especially important consideration with software for younger users. **PS** = Play system, in the games reviews, the quality of the game design and the game's playability. **GQ** = Graphics quality, also evaluated in light of each particular brand's graphics capabilities. **EU** = Ease of use after the initial learning period, which varies from computer to computer. **V** = Value for money.

HOME BUSINESS/HOME MANAGEMENT

Title Manufacturer Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings O	D	EH	GQ	EU	V
BANK STREET SPELLER Broderbund Software 17 Paul Drive San Rafael, CA 94903-2101 (415) 479-1170 $69.95 ©1984	Spelling checker automatically proofreads documents created with *Bank Street Writer*. Use preprogrammed 30,000-word dictionary or lists you add to package. Includes features to help you figure out spelling of difficult words. —WILSON	Apple II series, 48K (d.).	Unlimited warranty; $7.50 fee if user-damaged.	★★★★	★★★★	★★★	N/A	A	★★★★
COMPLETE PERSONAL ACCOUNTANT Futurehouse P.O. Box 3470 Chapel Hill, NC 27514 (800) 334-7638 $79.95 © 1983	Families with complex finances and some accounting knowledge may benefit from 10-program package with budget and checkbook maintenance, automatic bill payment, bar-graph display, etc. —AKER	Reviewed on C 64 (d. and cass.). Also for Atari Home Computers, 48K (d.). Translator disk required for XL series; TRS-80 CoCo, 32K (d.). Versions planned for Apple and IBM.	30-day warranty; $5 fee thereafter or if user-damaged. Free backup.	★★★	★★	★★	N/A	D	★★★
DOLLARS AND SENSE Monogram 8295 S. La Cienega Blvd. Inglewood, CA 90301 (213) 215-0529 $100 (Apple II/II plus/IIe) $119.95 (Apple IIc) © 1983	Track personal and small business finances. Organizes up to 120 categories (insurance payments, credit cards, etc.). Automatically balances records with each transaction. For users with some computer know-how. —KRENGEL	Reviewed on Apple II/II plus/IIe, 48K (d.)/IIc, 128K (d.). Versions planned for Apple Macintosh and IBM.	90-day warranty; $15 thereafter, or if user-damaged, and for backup. Backup included with Apple IIc.	★★★★	★★★	★★★★	N/A	D	★★★★
MICRO ATLAS Columbia Software 5461 Marsh Hawk Way P.O. Box 2235 Columbia, MD 21045 (301) 997-3100 $24.95 © 1980	Locate one of 411 cities on a high-resolution map of the U.S. and parts of Canada. Find out distance and direction between two locations graphically displayed on screen.† —WILSON	Apple II series, 48K (d.).	15-day warranty; user makes backup.	★★★★	★★★	★★	★★★	E	★★★
THE PRINT SHOP Broderbund Software 17 Paul Drive San Rafael, CA 94903-2101 (415) 479-1170 $49.95 ©1984	Fun utility lets everyone in the family design and print out greeting cards, signs, letterhead. Package comes with special colored paper on which to print creations.† —FRANK	Apple II series, 48K (d.).	90-day warranty; $10 fee thereafter or if user-damaged. User makes backup.	★★★★	★★★	★★★	★★★	E	★★★★
ROADSEARCH-PLUS Columbia Software 5461 Marsh Hawk Way P.O. Box 2235 Columbia, MD 21045 (301) 997-3100 $74.95 © 1983	For frequent travelers. Input city of origin and destination. Computer calculates best travel route, furnishing mileage, fuel, and time information. Use preprogrammed cities and roads or those you enter.† —WILSON	Reviewed on Apple II series, 48K (d.). Also for C 64 (d.).	15-day warranty if not user-damaged. User makes backup.	★★★★	★★★	★★★	★★★	E	★★★★

RATINGS KEY **O** Overall performance; **D** Documentation; **EH** Error-handling; **GQ** Graphics quality; **EU** Ease of use; **V** Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★★ Excellent; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart

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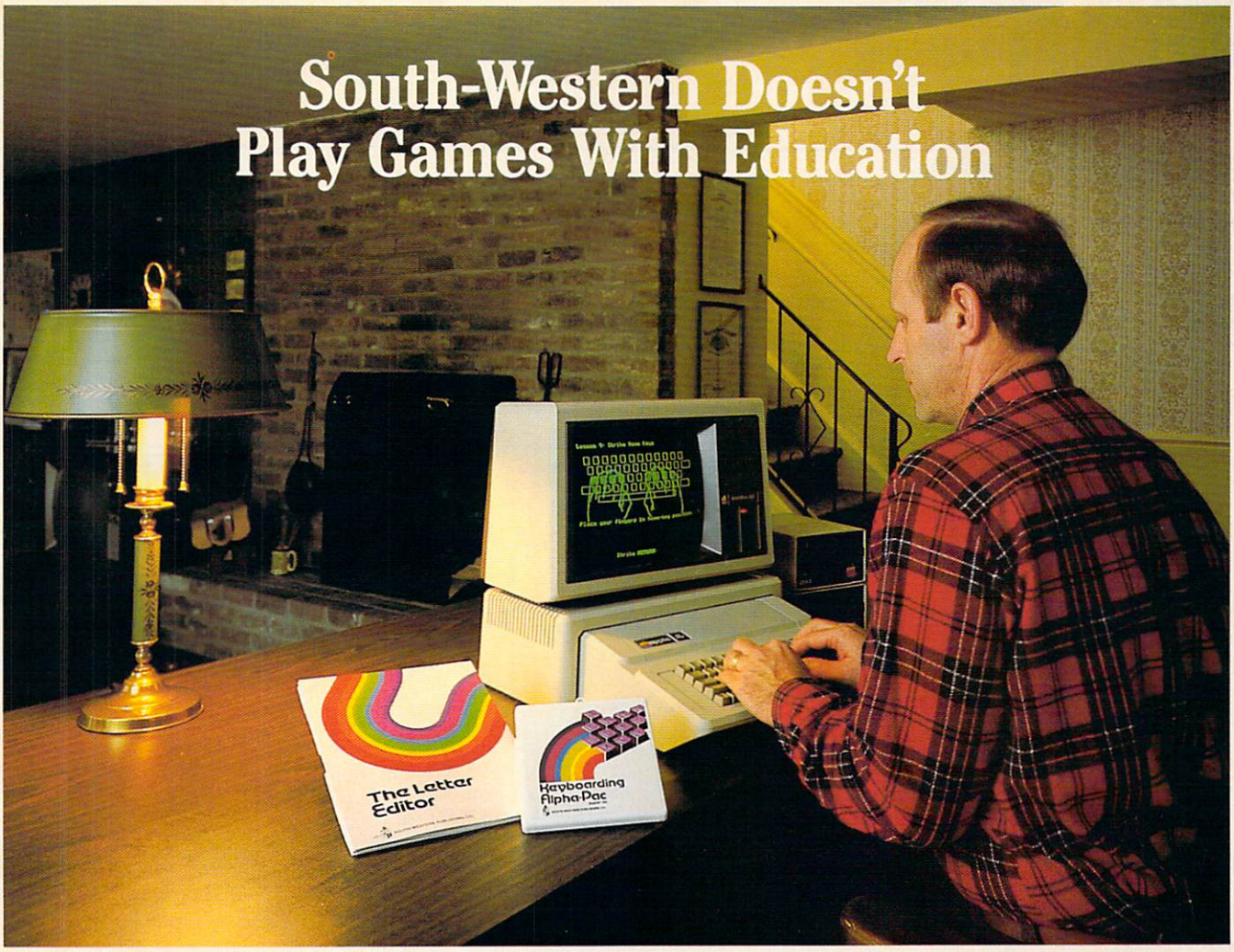

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(Sorry, we do not honor VISA/Mastercard outside the U.S.A. and its possessions.)

WHAT'S IN STORE
SOFTWARE GUIDE

EDUCATION/FUN LEARNING

Title Manufacturer Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings O	D	EH	GQ	EU	V
DUCKS AHOY! CBS Software One Fawcett Place Greenwich, CT 06836 (203) 622-2503 $37.95 (cart.), $29.95 (d.) $24.95 (cass.) © 1984	Catch ducks jumping from docks and deposit them safely on beach. Avoid the hippo who tries to tip your boat. Colorful, entertaining activities for ages 3–6. Gives practice in elemental strategy and prediction skills. —AKER	Reviewed on C 64 (d. and cart.). Also for Atari Home Computers, 32K (cass. and cart.). Joystick.	90-day warranty; $5 fee thereafter or if user-damaged.	★ ★ ★ ★	★ ★ ★ ★	N/A	★ ★ ★ ★	E	★ ★ ★ ★
FAY: THE WORD HUNTER Didatech Software Suite 549, 810 Broadway Vancouver, BC V5Z 4C9 (604) 687-3468 $34.95 © 1983	Wordsearch game in which 3rd- to 10th-grade students locate words, practicing vocabulary in 6 levels of difficulty. Use 3000-word dictionary or customize your own lists. —MORRIS	Reviewed on Apple II series, 48K (d.). Also for C 64 (d.).	Unlimited warranty; $10 fee if user-damaged and for backup.	★ ★	★ ★ ★	★ ★ ★	★ ★	E	★ ★
FUZZYWOMP Sierra Inc. P.O. Box 485 Coarsegold, CA 93614 (209) 683-6858 $29.95 © 1984	Four activities teach counting, number sequence, and pattern-matching skills. Play advances gradually as child's skill improves. Well-planned so preschoolers won't outgrow it quickly. —SUMMERS	Apple II series/III w/emulator, 48K (d.).	90-day warranty; $5 fee thereafter or if user-damaged.	★ ★ ★ ★	★	★ ★ ★ ★	★ ★ ★	E	★ ★ ★ ★
KIDS SAY THE DARNDEST THINGS TO . . . COMPUTERS Home Computer Software, Inc. 1307 S. Mary Ave., No. 209 Sunnyvale, CA 94087 (408) 554-7826 $39.95 © 1983	Your responses to a series of questions form the basis of one of 10 amusing stories that contain subtle moral teachings. Fun activity recommended for parents and children together, kids over 8 alone.† —BUMGARNER	Reviewed on C 64 (d.). Also for Apple II/II plus/ IIe, 48K (d.); Atari Home Computers, 48K (d.); version planned for IBM PCjr, 48K (d.).	90-day warranty.	★ ★ ★	★ ★ ★	★ ★ ★ ★	N/A	E	★ ★ ★
MATH MILEAGE CBS Software One Fawcett Place Greenwich, CT 06836 (203) 622-2500 $37.95 (cart.), $29.94 (d.), $24.95 (cass.) ©1984	Kids steer race car up track, choosing road forks labelled with numbers that help them reach numerical goal. Fun arcade game keeps kids excited while they practice addition, subtraction, multiplication, and division.† —LAMB	Reviewed on Atari 800/ XL series, 16K (cart.) and 48K (cass.). Also for C 64 (cart. and d.).	90-day warranty; $5 fee thereafter.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★
POSTER Scholastic Software 730 Broadway New York, NY 10003 (212) 505-3000 $24.95 © 1984	Ages 9+ create colorful screens using special keyboard commands in graphics program. Encourages logical thinking and makes a good intro to programming. —BYRNE	Reviewed on Apple II series, 48K (d.). Also for C 64 (d.).	60-day warranty; $5 fee if user-damaged; after 60 days $5 fee, $10 fee if user-damaged; user makes backup.	★ ★ ★	★ ★ ★	★ ★ ★ ★	★ ★ ★	A	★ ★ ★ ★
RANCH Spinnaker Software Corp. One Kendall Square Cambridge, MA 02139 (617) 494-1200 $39.95 © 1984	Use joystick to create a ranch scene, selecting from bank of preprogrammed images. Animate screen to make buffalo roam and antelope play. Save creations in delightful activity for kids 5+.† —SUMMERS	Reviewed on C 64 (d. and cart.). Version planned for Atari Home Computers. Joystick.	30-day warranty; $12 fee for backup; $5 fee if user-damaged.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	E	★ ★ ★ ★
SNOOPER TROOPS #2 Spinnaker Software Corp. One Kendall Square Cambridge, MA 02139 (617) 494-1200 $44.95 $39.95 (C 64) © 1982	Kids ages 10+ must solve case of the disappearing dolphin by roaming about town, picking up clues interviewing suspects, practicing deduction, problem-solving, logic skills. —MORRIS	Reviewed on Apple II series, 48K (d.). Also for Atari Home Computers, 48K (d.); C 64 (d.); IBM PC/PCjr, 64K (d.).	30-day warranty; $12 fee for backup; $5 fee if user-damaged.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	A	★ ★ ★ ★

RATINGS KEY **O** Overall performance; **D** Documentation; **EH** Error-handling; **GQ** Graphics quality; **EU** Ease of use; **V** Value for money; * Poor; ** Average; *** Good; **** Excellent; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart

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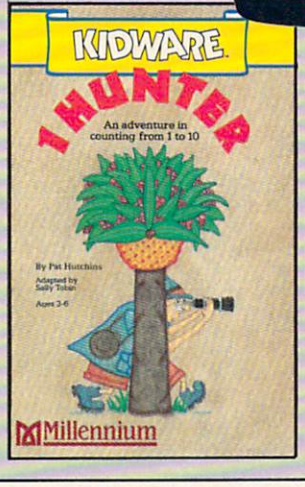
The Three Bears

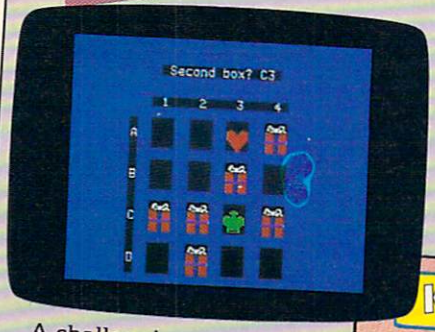
The classic fairy-tale of Goldilocks and the Three Bears comes to life in new interactive form. The graphics are bold and bright and the story unfolds as *your child* directs. Like a picture book, a tale for you and your child to read and share together. By Gladys J. Reich and Laura Boxer. Illustrated by A. Barbara Jurgensen. Ages 3–7. $39.95.

1 Hunter



Journey through a wondrous jungle with 1 Hunter, past colorful and playful animals, counting them as the Hunter goes. And when the story is complete, the program becomes a new counting game, reinforcing learned skills. This is the first program drawn from a book by Pat Hutchins, the well-loved Kate Greenaway Medal recipient, and is remarkably true to her style. Adapted by Sally Tobin. Ages 3–6. $34.95.

Concentration



A challenging memory testing and building game for the entire family. Five separate games—balloon games for the youngest child, flag matching for the entire family, and Morse code for the hardest Concentration ever. And with varying levels of difficulty, everyone can play. By Gladys J. Reich, Laura Boxer, and Ronald S. Lizzi. Ages 5–adult. $34.95.

For the Apple IIe and II+. Coming soon for IBM. Copyright © 1984 Millennium Group Incorporated. Apple IIe and II+ are trademarks of Apple Computer, Inc. IBM is a trademark of International Business Machines Corp.

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GAMES REVIEWS BY JAMES DELSON

Title Manufacturer Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings O	D	PS	GQ	EU	V
CARRIER FORCE Strategic Simulations, Inc. 883 Stierlin Road Bldg. A-200 Mountain View, CA 94043 (415) 964-1353 $59.95 © 1983	Fight W.W. II's battles of the Coral Sea, Midway, Santa Cruz, etc., using every ship and plane that actually took part. Too complex for most, but good for war-gamers interested in air and naval tactics.	Reviewed on Apple II with Applesoft ROM Card/II plus/IIe, 48K (d.). Also for Atari Home Computers, 48K (d.). Version planned for C 64.	14-day money-back guarantee; 30-day warranty; disk replaced free if user-damaged; $10 fee thereafter or for backup.	★ ★ ★	★ ★ ★	★ ★ ★	★	D	★ ★ ★
CLOSE ASSAULT Avalon Hill Game Co. 4517 Harford Road Baltimore, MD 21214 (301) 254-5300 $35 (d.); $30 (cass.) ©1983	Program keeps track of unit strength and movement on mapboard field. Adds element of chance to German and Russian encounters in W.W. II war game.†	Reviewed on Atari Home Computers, 48K (d.), XL series requires translator disk. Also for Apple II series, 48K (d. and cass.); TRS-80 Models I/III/4, 48K (d. and cass.).	Lifetime warranty; no policy for user-damaged.	★ ★	★ ★ ★	★ ★	N/A	A	★ ★
DUNZHIN Screenplay P.O. Box 3558 Chapel Hill, NC 27514 (800) 334-5470 $29.95 © 1982	Map your way through a maze in search of a precious object. Gain experience and strength in slightly outdated fantasy role-playing game best for younger players (10+) new to the genre.†	Reviewed on Apple II plus/IIe, 48K (d.). Also for Atari Home Computers, 48K (d. and cass.); C 64 (d. and cass.); IBM PC, 128K (d.).	14-day warranty; $5 fee if user-damaged; $3 for backup.	★ ★	★ ★ ★	★ ★	★ ★	E	★ ★ ★
EXODUS: ULTIMA III Origins Systems 1545 Osgood St., Suite 7 North Andover, MA 01845 (617) 681-0609 $59.95 © 1983	Muster a band of adventurers and set forth, mapping a rich world comprised of many cities and ages in search of the evil ruler, Exodus. One of the grandest adventures seen yet.†	Reviewed on Apple II series, 48K (d.). Also for Atari 400/800, 48K (d.); C 64 (d.); IBM PC/PC*jr*, 48K (d.).	90-day warranty; $5 fee thereafter or if user-damaged.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★	★ ★ ★	D	★ ★ ★ ★
GUMBALL Broderbund Software 17 Paul Drive San Rafael, CA 94903 (415) 479-1170 $29.95 © 1983	Sort gumballs into the right bins as they come off a crazy assembly line. Do well and you'll move up in the company. Colorful, fun, easy-to-play arcade game for ages 7+.	Reviewed on Apple II series, 48K (d.). Also for Atari Home Computers, 48K (d.). Joysticks and/ or paddles.	Lifetime warranty; $5 fee if user-damaged.	★ ★	★ ★	★ ★ ★	★ ★ ★	E	★ ★
JAMES BOND 007 Parker Brothers 50 Dunham Road Beverly, MA 01915 (617) 927-7600 $40 © 1983	As James Bond, you pilot your flying submarine car across dangerous terrain, avoiding destruction while eliminating foes in 4 miniscenarios. Fun short-term play for ages 8+.	Reviewed on C 64 (cart.). Also for Atari Home Computers, 16K (cart.); Coleco ADAM (cart.). Joystick.	180-day warranty; $8 fee thereafter. No backups.	★ ★	★ ★ ★	★ ★	★ ★ ★	D	★ ★
RINGSIDE SEAT Strategic Simulations 883 Stierlin Road Bldg. A-200 Mountain View, CA 94043 (415) 964-1353 $39.95 © 1983	Fascinating simulation of pro boxing lets players "manage" skills of famous or fictitious fighters. Statistically challenging, but limited in action, and lacking color. For ages 10+.	Reviewed on C 64 (d.). Also for Apple II series/III w/emulator, 48K (d.).	14-day money-back guarantee; 30-day warranty; $10 fee thereafter or for backup.	★ ★	★ ★ ★	★ ★ ★	★	A	★ ★
THE SEVEN CITIES OF GOLD Electronic Arts 2755 Campus Drive San Mateo, CA 94403 (415) 571-7171 $40 © 1984	Sail for the Americas seeking riches, converts, and royal recognition. Map uncharted territory as it was in the 1400s or explore a fantasy earth created by computer in fascinating adventure game. One of 84's best.†	Atari Home Computers, 48K (d.). Version planned for C 64. Joystick.	90-day warranty; $7.50 fee thereafter.	★ ★ ★ ★	★ ★ ★	★ ★ ★ ★	★ ★ ★	D	★ ★ ★ ★
TOURNAMENT GOLF Avalon Hill Game Co. 4517 Harford Road Baltimore, MD 21214 (301) 254-5300 $30 © 1983	Golf simulation allows players to hit from all angles, making this program like a big game of billiards with hazards. Slightly awkward play system. Suitable for ages 8+.	Reviewed on Apple II series, 48K (d.). Also for C 64 (d.). Joystick or paddles.	Lifetime warranty; $10 fee if user-damaged.	★ ★	★ ★	★ ★	★ ★	E	★ ★
WIZARDRY: LEGACY OF LLYLGAMYN Sir-tech Software, Inc. 6 Main St. Ogdensburg, NY 13669 (315) 393-6633 $39.95 © 1983	Track down a mystical orb, taking on snakes and evil things while mapping your way through a maze. Start out using your wits and lesser spells in installment No. 3 of famous role-playing series.†	Apple II series, 48K (d.).	30-day warranty; $5 fee thereafter or if user-damaged. User makes backup.	★ ★ ★ ★	★ ★ ★	★ ★ ★ ★	★ ★ ★	A	★ ★ ★ ★

RATINGS KEY **O** Overall performance; **D** Documentation; **PS** Play system; **EH** Error-handling; **GQ** Graphics quality; **EU** Ease of use; **V** Value for money; * Poor; ** Average; *** Good; **** Excellent; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart

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In *Donkey Kong Jr.*[2] by Nintendo[2], Junior tries to rescue his father against immense odds. And speaking of Donkey Kong, there's also *Mario Brothers*[2] by Nintendo[2]. This time, Mario and his brother Luigi battle creatures on four levels of floors, encountering all sorts of treacherous enemies.

In *Track And Field*[3] you can compete by yourself or head-to-head with another player. But each player must beat qualifying times, heights and distances before they can compete in each of the gruelling six events.

Typo Attack is the much-acclaimed, fun-filled program that allows you to enjoy developing your typing skills at any level.

And still playing to the delight of audiences everywhere are *Pac-Man*[4]; *Ms. Pac-Man*[4]; *Jungle Hunt*[5]; *Battlezone*™; *Donkey Kong*[2] by Nintendo[2]; *Centipede*™ and *Pole Position*[6].

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*Titles available on IBM PC jr. are Ms. Pac-Man, Centipede, Donkey Kong, Moon Patrol[7] and Typo Attack. Available on the VIC 20 is Typo Attack.

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WHAT'S IN STORE SOFTWARE REVIEWS

On the following pages, you'll find in-depth reviews of some of the programs listed in the Software Guide. Refer back to the Guide on page 114 for information such as backup policies and addresses of software manufacturers.

HOME BUSINESS/ HOME MANAGEMENT APPLICATIONS

Micro Atlas and Roadsearch-Plus

HARDWARE REQUIREMENTS: Apple II series, 48K (disk). (*Roadsearch-Plus* also for Commodore 64.)
MANUFACTURER: Columbia Software
PRICE: $24.95, $74.95

These programs present a really innovative use of the computer. If your family is the kind that vacations in the car, or if your business requires you to do extensive traveling, they'll provide information that is immediately useful and acts as a reference in the long run.

With *Micro Atlas* you can locate one of 411 cities on a map of the U.S. and parts of Canada. The computer will indicate a city's location on the high-res map, with latitude and longitude displayed at the bottom of the screen. You may also enter any two cities and the computer will show a connecting line between them as the crow flies, indicating distance and directional bearing.

With *Roadsearch Plus*, you type in the point of your trip's origin and your city of destination. The computer then calculates, displays, and prints out, if you choose, an itinerary of your best route. You'll get a complete travel breakdown, which analyzes the mileage, time, and fuel costs for each leg of the journey. You can add 50 extra cities or roadways of your own choosing to the already comprehensive preprogrammed files of 406 cities and 70,000 miles of interstate highway.

Another program by Columbia, *Routeplanner* lets you store a total of 400 different places as map coordinates. You designate specific starting and ending points of your travels, as well as any stops, which must be consecutive. The big advantage of *Routeplanner* is its ability to accommodate the variations of your journey.

Once you grasp the concepts of these programs, you'll find that they're reasonably easy to use. The manuals describe some of the more obvious uses of the programs, but I suspect that you'll find unique and valuable applications of your own. For example, consider them an aid to learning geography.

—DAVID WILSON

The Print Shop

HARDWARE REQUIREMENTS: Apple II series, 48K (disk).
MANUFACTURER: Broderbund Software
PRICE: $49.95

The Print Shop is an exciting, different, and fun application. It's a utility that turns your computer into a mini printing press.

With minimal help, my 9-year-old daughter easily designed a sign for her room that read SISTER ABUSE—PREVENT IT.

Not to be outdone, her older sister then designed a letterhead with her name and address centered at the top, two teddy bears on either side, and a row of teddy bears across the bottom of the page. The quality of the final products was excellent.

In designing each piece, you have numerous options. You can choose among different typefaces, pictures, and borders. And you can type in your own messages. It's easy to adjust the size and placement of designs, patterns, and letters. Selecting the different parts of your card, sign, or message is just a matter of picking from the choices displayed on screen. The program handles change quite nicely. At any point in the design process, you can press the ESC button to move back through the various choices you've made.

If the more than three dozen designs provided don't suit you, draw your own using a "graphics editor" and the keyboard, joystick, or KoalaPad. It's tough to get good graphics quality using the keyboard. For best results, I'd recommend the KoalaPad. You also can create oversize messages, big cards, or small signs, and save the graphic designs on your disk for future use.

Unfortunately, you can't save standard-size creations, or the complete border, message, and typeface units on disk. This, plus the fact that you can't view your creation before it's printed out are minor drawbacks compared to the program's overall advantages. I created most of the signs for our school fair and have already started to customize my stationery, season by season.

—CATHY FRANK

EDUCATION/FUN LEARNING ACTIVITIES

Kids Say the Darndest Things . . . To Computers

HARDWARE REQUIREMENTS: Reviewed on Commodore 64 (disk). Also for Apple II/II plus/IIe, 48K; Atari Home Computers, 48K. Version planned for IBM PC*jr*.
MANUFACTURER: Home Computer Software, Inc.
PRICE: $39.95

In spite of its unfortunate title (a holdover from an old-fashioned era), this program functions quite well. Art Linkletter interviews the players to elicit biographical and other information. The answers are then used to build some amusing stories interspersed with moral teachings.

My son John picks up moral lessons from school, stories, and even occasional TV shows. This program illustrates how the computer also can be a valid medium. The morals that underlie the stories in this package, stories like "John's Very Strange Day" or "The Best Present John Ever Gave," are not heavy-handed. ("WE MUST ALWAYS BE CAREFUL NOT TO HURT PEOPLE'S FEELINGS, JOHN.") John plays a lot of games, and he found these stories fun and not too corny. It's recommended that you sit down with your younger children at the computer and play along with them. This makes the program a good vehicle for family interaction.

Kids can opt not to answer the questions. In that case, Art himself creates the stories with answers randomly picked from a prewritten list. With or without the personalization, they're entertaining and can be printed out.

—MARLENE ANNE BUMGARNER

Math Mileage

HARDWARE REQUIREMENTS: Atari 800/XL series, 16K (cartridge), 48K (cassette). Also for Commodore 64. Joystick.
MANUFACTURER: CBS Software
PRICE: $37.95 (cartridge), $32.95 (disk and cassette).

Whoever got the idea of turning *River Raid* or *Pole Position* into a math challenge found a truly enjoyable way of drilling math skills. The point of this three-level game is to steer your race car through the countryside, choosing the route that will al-

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SOFTWARE REVIEWS

low you to reach a numeric goal in the shortest, fastest way possible.

In level one each fork gate bears the number 1 or 10. If you have a goal of 24, then you go twice through the 10 forks, and four times through the 1 forks. Higher levels require the racer to multiply a number between 2 and 5 and add 10, or multiply a number between 2 and 9. In the "night driving" option your tally is turned off, so you have to remember the score in your head.

I've raced continuously with my boys, and they (ages 6–8) race with each other. As you move up the scrolling screen, without the typical arcade three- or five-life limitation, the real challenge is in beating the clock and your opponents' timed scores, traveling through the least number of gates to make the numerical goal.

You're always on the move, constantly thinking, trying to improve your score, and practicing math computation. My only criticism was that when you move from the first into the second and third levels, you have to make a big leap. The multiplication really requires players to do reverse math thinking. An increased, more defined number of skill levels, 10 for instance, would have helped. Another improvement (though probably a difficult programming task) would have been to

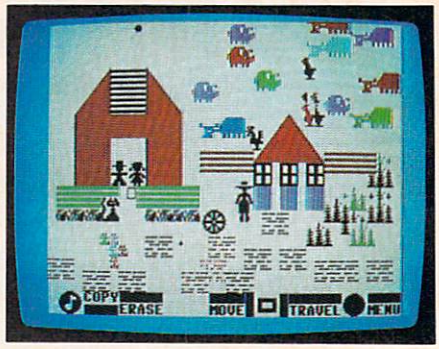
allow the users to back up, subtracting or dividing from their tally if they took the wrong fork.

—RICHARD LAMB

Ranch

HARDWARE REQUIREMENTS: Commodore 64 (cartridge). Version planned for Atari Home Computers. Joystick.
MANUFACTURER: Spinnaker Software
PRICE: $39.95

Even junior city slickers who think Roy Rogers is just a restaurant will have fun creating their own ranch



scenes with this colorful activity.

Ranch lets you choose geometric or special preprogrammed shapes with the joystick and place them on the drawing screen. Move the joystick and push the fire button to pick up a rabbit, or logs for a cabin. Back at the ranch, another click pastes a figure on screen. Use the menu of operations to change an object's (or the background's) color, move it to another spot, or copy it. You can add music, too.

Best of all the options is the one that lets you animate your scene. The deer lifts its head, flames leap from campfires, the coyote howls. You can save and restore your scenes. Children like to play them back for each other.

Ranch is intended for ages 5 through 10, but in fact, it appeals to most family members, regardless of age.

Ranch is educational, though not in the usual, classroom-oriented sense. Children are encouraged to make choices in color and balance. Like more traditional toys, such as blocks and paper dolls, *Ranch* offers a child a restful but creative retreat from more hectic activities.

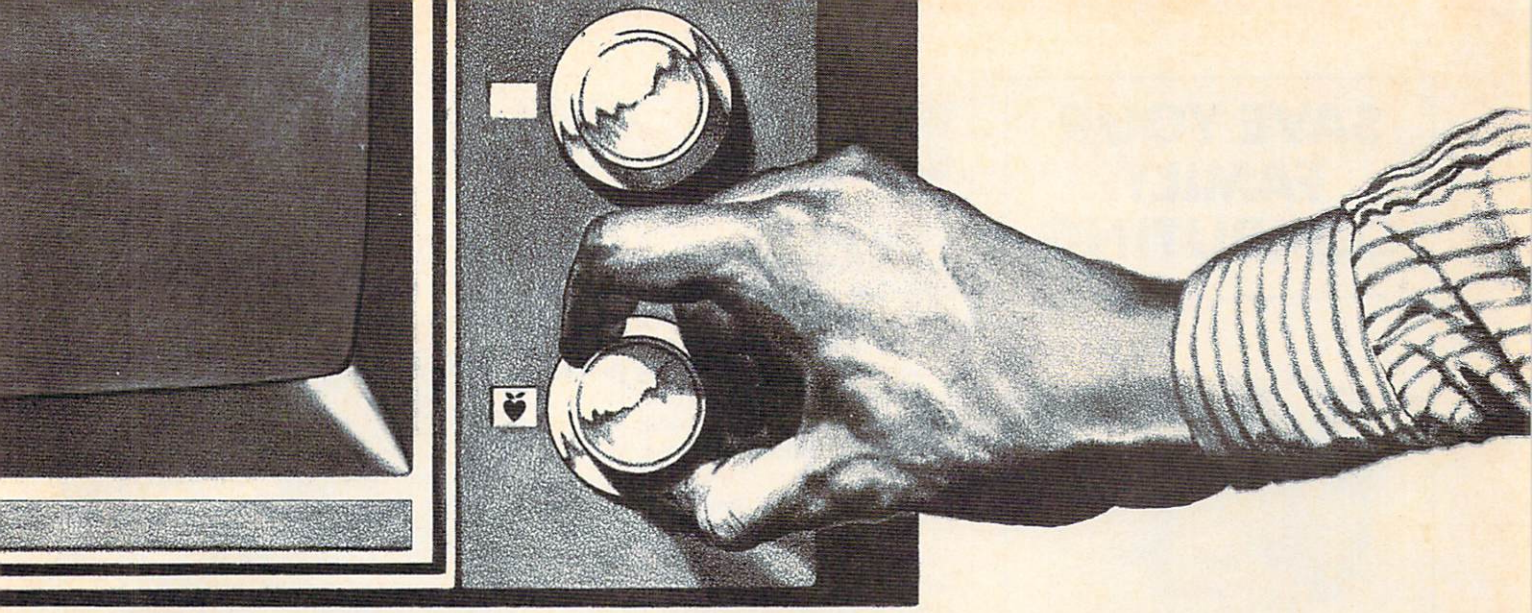
—TAN A. SUMMERS

GAMES

Close Assault

HARDWARE REQUIREMENTS: Atari Home Computers, 48K (disk). Also for Apple II series, 48K; TRS-80 Models I/III/4, 48K.
MANUFACTURER: Avalon Hill
PRICE: $35 (disk), $30 (cassette).

Avalon Hill's Squad Leader wargame series has probably become as much a part of the gaming hobby as Dungeons and Dragons, Diplomacy, and Risk. But keeping track of all the resources, supplies, strength,



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SOFTWARE REVIEWS

rations, morale, etc. of your squadrons is an enormous task. *Close Assault* is a computerized version that relieves the hours of bookkeeping required to play the game.

Set in World War II, *Close Assault* pits your choice of two (American, German, or Russian) troops against one another in a series of confrontations. Scenarios range from opponents' defense of their strongholds to the harassment of an enemy as it advances, and more, as players create games that reflect their personal skills, strategic strengths, or weaknesses. The program enhances the traditional board game. It provides for truly hidden movement, furnishes a computerized "umpire" to settle disputes, and allows gamers to play alone, against the computer, or against another person.

The program comes with a detailed mapboard. The screen display merely indicates the status of each player's forces. You keep track of your positions with pieces that represent the various units of action. If you decide to call it quits for an evening, or you accidentally overturn the board, the computer keeps track of the pieces' locations.

Playtesters found the game similar to Squad Leader, but complained about the inability of units to interchange weapons once the game was started.

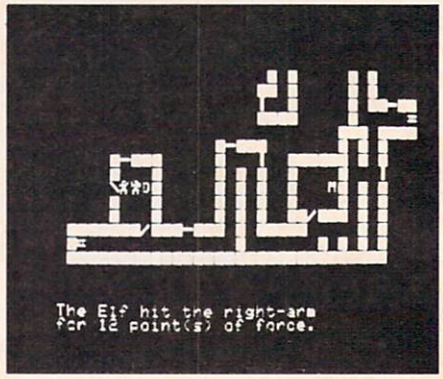
If you're interested in serious play, and have some war-gaming experience, you'll find *Close Assault* an interesting, easy-to-learn, intermediate-level program good for ages 12 and up.

Dunzhin

HARDWARE REQUIREMENTS: Apple II plus/IIe, 48K (disk). Also for Atari Home Computers, 48K; Commodore 64; IBM PC, 64K.
MANUFACTURER: Screenplay
PRICE: $29.95

Best regarded as an introductory scenario for novices, this role-playing adventure game is a bit outdated. You're thrust into a maze, ordered to pick up a precious object, and left to your own devices to obtain it.

Using the keyboard, you wander through a labyrinth that slowly unfolds before you. You'll encounter monsters, traps, a teleporter that can throw you anywhere else on the same level, and a variety of rooms in which you may find treasure, trouble, or a chance to recover from your wounds. As in the *Apshai* series, the more experience you acquire in battle, the better your fighting ability



becomes. You can move faster, survive deeper wounds, and better defend yourself against harsh attack. Wounds aren't always fatal, but you can't voluntarily regenerate yourself, as in other role-playing games.

Major drawbacks lie in the inability of players to create their own characters, and a slow combat system in which blows are exchanged one at a time. Dungeon levels are very similar and one game plays very much like the last, or the next. On the positive side, the game can be played by practically anyone, offering a chance for younger players, ages 10 and up, to play a real game instead of one intended solely for children.

Playtesters found *Dunzhin* a challenge for about an hour. They agreed that had this game been played when it first came out, two or three years ago, it would have been more challenging and more interesting.

Wizardry: Legacy of Llylgamyn

HARDWARE REQUIREMENTS: Apple II series, 48K (disk).
MANUFACTURER: Sir-tech Software Inc.
PRICE: $39.95

Here's the third scenario in the *Wizardry* saga, the most popular and involving role-playing adventure series in the short history of computer games. I'm glad to report that *Legacy of Llylgamyn* is as much fun, and as involving as its predecessors.

Set a generation after the first two scenarios, *Llylgamyn* has been written so that newer (less experienced) heroes must be called upon to save the day for the good guys. Instead of transferring the characters developed in the first and second adventures into Llylgamyn, as you must

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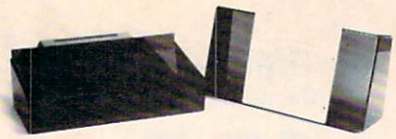

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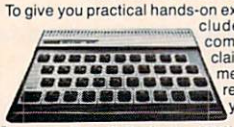

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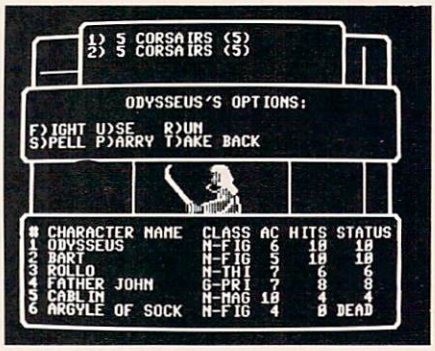
when going from *Wizardry* to *Knight of Diamonds*, only the name, rank, and certain powers of the "ancestors" may be used in the new game.

Some may object to this because the new game calls upon us to give up practically all the spells, skills, and wealth we've acquired through long, hard campaigning against the evildoers of this fantasy world. But the creators of the new game realized that action is action, regardless of the powers and weapons wielded by our heroes. By making us go back to being first-level characters again, we're forced to fight with monsters, not simply haul out the heavyweight spells or fancy weapons to nuke the opposition.

Llylgamyn offers players the chance to polish their wits and make the best use of the lesser spells and weapons at hand as they search for treasure in the maze's depths. Use your gifts wisely and back up those disks, because this game is a tough challenge for all who participate.



Playtesters questing through six months of *Llylgamyn* found the game wholly involving. They appreciated the full-screen graphics that replaced the disappointing quarter-screen visuals used in the first two games. Not to be missed, this is suitable for ages 10 and up.

The Seven Cities of Gold

HARDWARE REQUIREMENTS: Atari Home Computers, 48K (disk). Version planned for Commodore 64. Joystick.
MANUFACTURER: Electronic Arts
PRICE: $40

Return to those daring days of yesteryear when brave men in tall ships set sail to discover new lands, slaughtering or converting the natives and filling the coffers of their lords with ill-gotten gains. Dan and Bill Bunten, who gave us *M.U.L.E.*

last year and *Cartels and Cutthroats* the year before that, have devised a superb new game of colonial greed, lust for power, and Spanish conquest in the Great Age of Discovery (about 1492–1540).

Experience either the historical scenario, in which your intrepid adventurers sail to subdue or colonize the Americas, or the "World Maker," which creates a fantasy earth ruled by such people as the Incas, Japanese, or Aztecs. Your goal is to rise in rank and prestige by overcoming such obstacles as weather, the vast expanse of ocean that separates you from your mother country, the sometimes hostile local populace, and death by starvation. Succeed, and the King of Spain will make you a Viceroy. Fail and die, or perhaps even worse, fade into obscurity.

Sound like fun? It is. And funny, too, just like *M.U.L.E.* Only this time you have to balance more than just interplanetary exploration and resources. If you're to fare well you must demonstrate superior skill in a variety of endeavors: as a mapmaker and map reader, farmer (food crops keep you alive), politician (in order to make peace with the local headmen, chiefs, emperors, and kings you encounter), soldier (if talking doesn't work), tax collector, navigator, and explorer.

Seven Cities Of Gold is more than just an intellectual exercise. You use your joystick to maneuver your conquistador around the beautifully scrolling mapboard, taking him into harm's way and back out again—if you can survive pitched battles in town plazas, ambushes in secluded valleys, treacherous seas that you must navigate when your men are aboard your fleet, and landing on unfamiliar coastlines. One of the most enjoyable games of 1984, this is another winner from the Buntens and Electronic Arts, suitable for ages 12 and up.

Exodus: Ultima III

HARDWARE REQUIREMENTS: Apple II series, 48K (disk). Also for Atari, 48K; Commodore 64; IBM PC/PC*jr*, 48K.

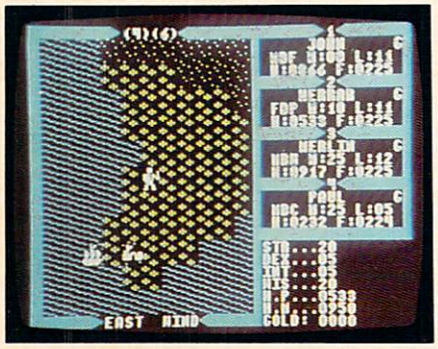
MANUFACTURER: Origins Systems

PRICE: $59.95

This is a giant leap forward for the role-playing adventure genre. Featuring an innovative multiplayer combat system, in which several gamers can actively participate against the computer, *Exodus: Ultima III* is ideal as either a solo or multiplayer program. It lets you create characters from a menu of traits, including five races, 11 professions, three sexes, four areas of specialization, and a host of different weapons abilities.

Up to four of these characters set out, searching to conquer the evil ruler, Exodus. Traveling across the "world" by foot, horse, pirate ship, and teleportation, your party will visit cities, towns, dungeons, and a secret place. Players acquire additional equipment to strengthen their chances of success in this, the grandest of all adventures.

In sheer size and scope, *Exodus: Ultima III* dwarfs everything that has come before it. With eight cities, seven multileveled dungeons, two castles, and a secret place to map, gamers might be able to finish this



adventure in a year, playing once a week.

Battles take place on a separate screen against fearful and cunning opponents. Each of the four members of the party fights separately, but may work in concert. This multiplayer capability, plus the scope of the game, and the ability of characters to develop through means other than combat all pull together to make this an absolute must for gamers of all ages over 10, a bit younger with adult help.

—GAME REVIEWS BY JAMES DELSON

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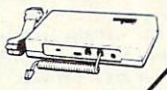

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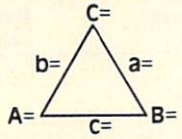

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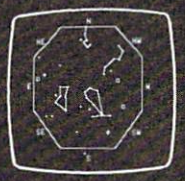

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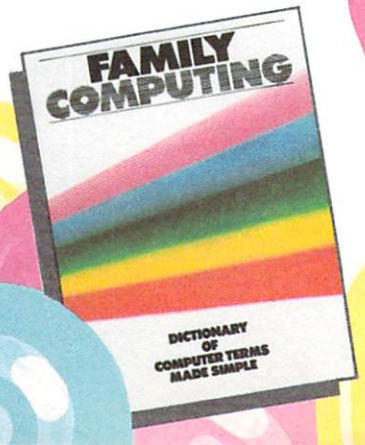

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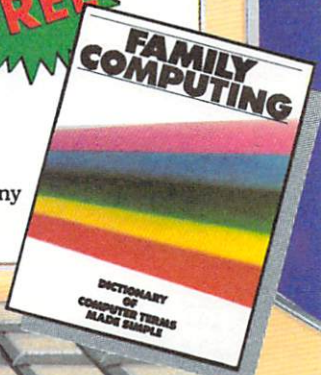

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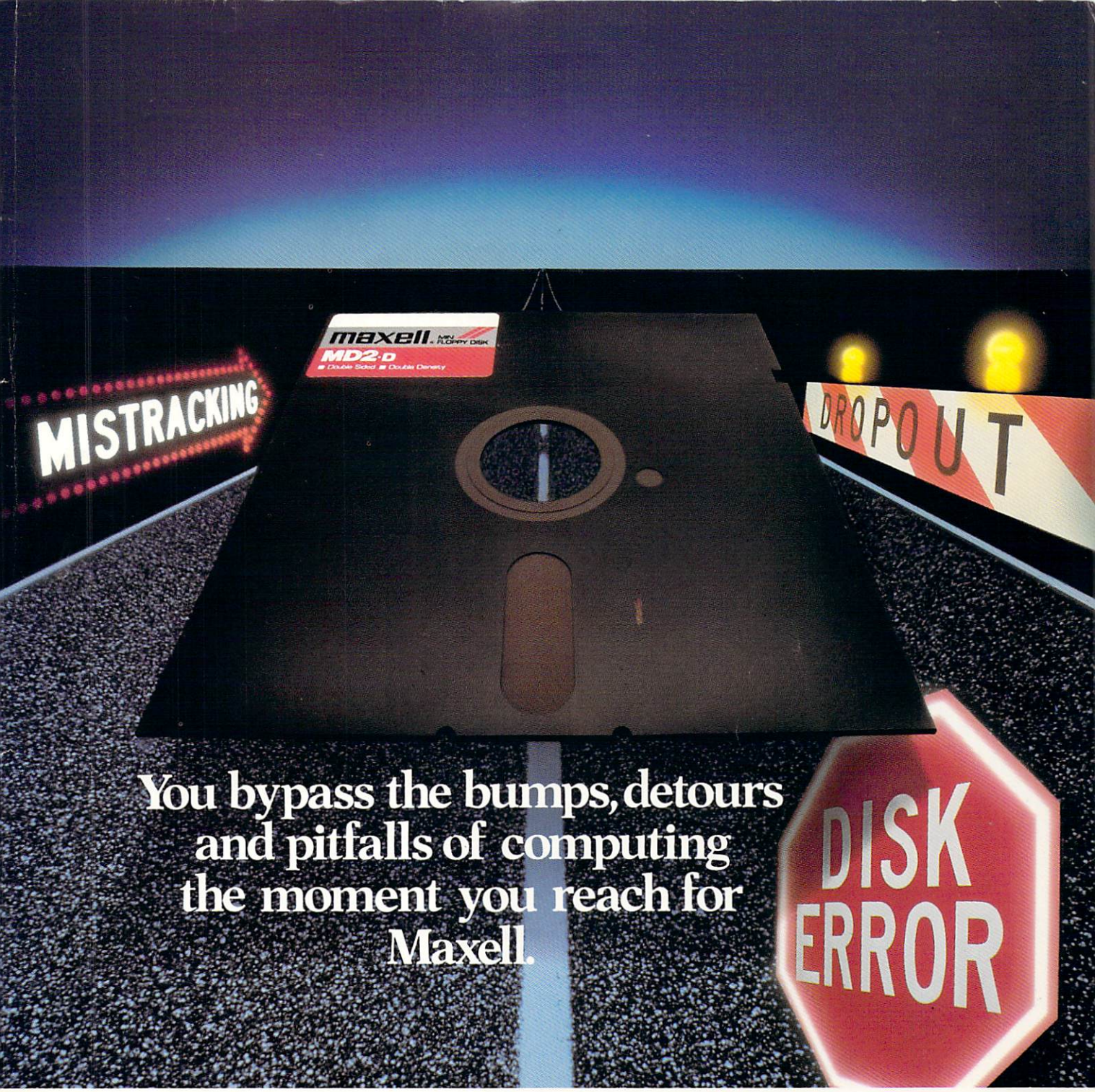

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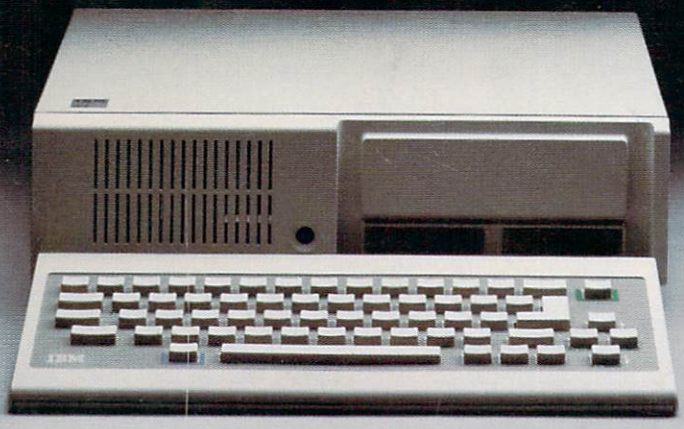

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